



Information Technology

Program of Studies
2015-2016



Carole Frakes, Program Consultant
Office of Career and Technical Education
Kentucky Department of Education



Information Technology

Course Title	Post-Secondary Connection	Valid Course Code	Recommended Grade Level								Recommended Credit
			6	7	8	9	10	11	12		
Accessing the WAN/Connecting Networks/Cisco IV	CIT 212	110905						X	X	1	
Advanced 3D Game Development	DGD232	113603					X	X	X	1	
Advanced Placement Computer Science A		110701						X	X	1	
C++ I	CIT 142	110202						X	X	1	
Computational Thinking	CIT 120	110251				X	X	X	X	1	
Computer Graphics (Formerly Digital Graphics Technology)		110213				X	X	X	X	1	
Computers, Networks and Databases (Informatics I)*SREB	*(INF120)	111001				X				1	
Computer Hardware & Software Maintenance	CIT 111	110101				X	X	X	X	1	
Computer Literacy	CIT 105	110110				X	X	X	X	1	
Computer Science Principles		110711					X	X	X	1	
Computer Science and Software Engineering (PLTW)		110730									
Databases in the Cloud (Informatics III) *SREB	*(CIT 170)	111003					X	X	X	1	
Design for the Digital World (Informatics II) *SREB	*(INF 128)	111002					X	X	X	1	
Developing a Cloud Presence (Informatics IV) *SREB		111004						X	X	1	
+Digital 3D Graphics & Special Effects II	DGD231	113604						X	X	1	
Digital Literacy	CIT 105	060112				X	X	X	X	1	
+Flash with Action Script		110810						X	X	1	
Game Design Principles		113605				X	X	X		1	
Game & Engine Development, Animation (Photoshop)	DGD131	113602					X	X	X	1	
GIS Software Tools & Applications	CIT 225	110315					X	X	X	1	
Help Desk Operations	CIT 232	110102					X	X	X	1	
Information Technology Co-op	CIT 199	110918						X	X	1	
Information Technology Internship	CIT 290	110919						X	X	1	
Internet Technologies	CIT 150	110917					X	X	X	1	
Introduction to Computer Science		110710				X	X	X	X	1	
+Introduction to Database Design (Fundamentals)	CIT 170	110211					X	X	X	1	
Introduction to Digital 3D Game Graphics	DGD 132	113601				X	X	X	X	1	
Introduction to GIS - ArcView	CIT 125	110107				X	X	X	X	1	
Introduction to Networking Concepts	CIT 160	110901				X	X	X	X	1	
JAVA I	CIT 149	110205						X	X	1	

JAVA II	CIT 249	110206						X	X	1
JavaScript	CIT 140	110809						X	X	1
LAN Switching and Wireless/Scaling Networks/Cisco III	CIT 209	110904						X	X	1
+Leadership Dynamics		110399				X	X	X	X	1
Management of Support Services (Previously Help Desk II) NEW		110302						X	X	1
+Microsoft Active Directory Server/Server Infrastructure Admin/Security+Certification	CIT 214	110907						X	X	1
Microsoft Client /Server Config	CIT 213	110913						X	X	1
Network Fundamentals: Introduction to Networks Cisco I	CIT 161	110902				X	X	X	X	1
+Network Hardware Installation and Troubleshooting	CIT 260	110906						X	X	1
Programming Introduction (e.g., JAVA, C++, Visual Basic)		110201				X	X	X	X	1
+Productivity Software	CIT 130	110204				X	X	X	X	1
Routing Protocols and Concepts – Routing and Switching Essentials/ Cisco II	CIT 167	110903					X	X	X	1
Security Fundamentals	CIT 180	110912						X	X	1
Special Topics in Computer Science	CIT 299	110752						X	X	1
Special Topics in GIS	CIT 229	110316								
+Special Topics in Information Support and Services	CIT 299	110152						X	X	1
+Special Topics in Networking	CIT 299	110952						X	X	1
+Special Topics in Programming	CIT 299	110252						X	X	1
+Special Topics in Web Development & Administration	CIT 299	110852						X	X	1
Visual Basic I	CIT 148	110207						X	X	1
Visual Basic II: Creating Desktop Applications	CIT 248	110208						X	X	1
Web Page Development	CIT 155	110801					X	X	X	1
Web Site Design & Production	CIT 157	110804					X	X	X	1

(+) Upon completion of a pathway, additional coursework to enhance student learning is encouraged. Credits earned in Advanced or Complementary Coursework “Beyond the Pathway” may not be substituted for pathway courses in order to achieve Preparatory or Completer status.

Information Technology

Overview of Information Technology

Purpose:

The vision of Kentucky Information Technology Education is to promote industry professional development, enhance leadership, provide relevant curriculum vital to the education of all students.

Kentucky Information Technology will:

- Operate as the center for industry standard desktop and communications technology in schools
- Provide a critical link in school to employment or postsecondary education
- Develop stronger relationships with the business community in terms of mutual advocacy, cooperative field experiences, employment placement and support for student organization experiences.
- Represent a necessary component in the education of all students
- Require and promote critical thinking and problem solving
- Offer a flexible curriculum based on standards that adapts to change
- Integrate academic skills into the information technology curriculum in order to insure that students develop excellent written and verbal communication skills, computational skills and scientific problem-solving skills.

Information Technology (IT) is the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware.

The “Computer Revolution” has affected all sectors of business. Almost all employers, from the largest manufacturer to the smallest retail store, need IT workers to keep their business operating smoothly. This demand translates into a real shortage of IT workers. According to the Information Technology Association of America, there is a projected gap of more than 800,000 unfilled IT positions this year. This fact makes IT the fastest growing employment opportunity in the nation.

Information Technology Careers prepare individuals to apply technical knowledge and skills in the rapidly growing occupational fields e.g. computer networking, programming, digital media, support services and e-commerce/web design. Information Technology Careers include eight (8) Career Pathways. They are: 1.) Network Administration; 2.) Information & Support Services; 3.) Web Development & Administration; 4.) Computer Programming*; 5.) Informatics; 6.) GIS (Geographic Information Systems); 7.) Computer Science; 8.) Digital Design/Gaming.

Each local school district offering classes in “Computers”, “Computer Science”, etc. is encouraged to submit a Career & Technical Education “career pathways request form” to the Office of Career & Technical Education, in order to become a part of the IT network of Kentucky schools. The purpose of this effort is to consolidate the many varied computer courses, classes, programs, and etc. under one Career & Technical Education program area. This will enable schools to provide better services to students through an organized, coherent network supported by the Office of Career & Technical Education.

All schools involved in the IT program are recommended to offer a “foundations” course (preferably at the 8th or 9th grade level). Students of Information Technology, regardless of which Career Pathway they choose to pursue, would take this course as a “first course”. The course “Computer Hardware and Software Maintenance” is recommended for the 10th grade level for career pathways in Information Support & Services and Networking. Also, the course “Computational Thinking” is recommended for the 10th grade level for Computer Programming, Digital Design/Gaming and Computer Science.

Students following career pathway course sequences have the opportunity to earn industry recognized certifications e.g. Network +, A +, I-Net +, Server + as they study for their pathway areas. Also many of these certifications may provide articulation opportunities for students who enter Kentucky Community and Technical Colleges, following high school graduation. It is encouraged that you utilize the Industry Certification List appropriate for the specific school year you are working.

The Program of Study for each career pathway in Information Technology is outlined in the attached “Career Pathway – Course Sequence” charts. Also, specific information on curriculum and course description with content/process information is included in this document. A career pathway description with content/process information is attached for each of the eight “career pathways” in Information Technology.

(Course descriptions/curriculum for courses such as A+, Nortel, CISCO, Novell, Microsoft, etc. should be secured from the company/vendor.)

Career Pathways:

- *Computer Programming*
- *Computer Science*
- *Informatics*
- *Web Development/Administration*
- *Digital Design & Game Development*
- *Information Support and Services*
- *Geographic Information Systems*
- *Network Administration*
 - *Non-Vendor*
 - *Microsoft (MCSA or MTA networking)*
 - *Cisco (CCNA or CCENT)*
 - *Security*

Standard Based Curriculum

The curriculum is composed of standards based competencies. Therefore, the teaching/learning focus is on the final results rather than the process. Information Technology Teachers are lecturing less and facilitating more, and as a result, students are taking charge of their own learning by using technology to research topics, collect data and present information orally and in written form. More Information Technology Programs are incorporating school-based enterprises in order for students to apply information technology concepts learned in the classroom.

Kentucky Occupational Skill Standards

The Kentucky Occupational Skill Standards are the performance specifications that identify the knowledge, skills, and abilities an individual needs to succeed in the workplace. Identifying the necessary skills is critical to preparing students for entry into employment or postsecondary education. Because of the importance of skill standards, the Office of Career and Technical Education in conjunction with industry to develop a system to certify that students have attained the necessary skills for employment or postsecondary education. Standards are being piloted in the areas of Web Development/Administration, Programming, Information Support & Services and Network Administration. These standards describe the necessary **occupational, academic, and employability** skills needed to enter the workforce or post-secondary education in specific career areas. There is an ongoing effort to continue to refine these standards by which exemplary Information Technology Programs are evaluated and certified. The strength of these business partnerships insures that curriculum meets industry specifications.

Interdisciplinary Courses

The Kentucky graduation requirements allow for interdisciplinary or applied courses to substitute for specific academic courses required for graduation.

School Based Enterprises

In many Kentucky high school Information Technology programs a school based enterprise is an integral part of the curriculum. Running an actual business allows students to learn contextually without leaving school. Textbook concepts become real as students operate a business.

Work Based Learning

Cooperative experience, internships, shadowing and mentoring opportunities provide depth and breadth of learning in the instructional program and allow students to apply the concepts learned in the classroom.

Students are encouraged to participate in cooperative education and other work-based learning experiences. Cooperative Education consists of in-school instruction combined with on-the-job work experience. Specific guidelines are outlined in 705 KAR 4:041. Information on other types of work-based learning are described in detail in the document [Work-Based Learning Guide 2000](#) available on the KDE web page at <http://education.ky.gov/CTE/cter/Pages/WBL.aspx>. ***Be sure to use the new course codes for Information Technology Co-op and Internship.

Student Organization

Each school offering a program in Information Technology is encouraged to offer an appropriate student organization, either FBLA or SkillsUSA. Participation in FBLA or SkillUSA organization meets the requirements of Kentucky CTE Program Assessment Standard 9. The student organization skills should be an integral part of the curriculum and included in daily lesson plans. They are also encouraged to have students participate in the Student Technology Leadership Program (STLP). Participation provides a vehicle for students to employ higher order thinking skills, to interact with high-level industry people and to further enhance their leadership skills through their participation in regional, state and national competitive events and local activities.

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

COMPUTER PROGRAMMING

CIP 11.0201.01

PATHWAY DESCRIPTION: The Computer Programming pathway courses will prepare students to design, create, and troubleshoot the latest programming languages used in industry. Students will complete the pathway with the four following courses: Computer Literacy, Computational Thinking, Programming Introduction, and a targeted course for a specific programming language as capstone. Upon completion of this career pathway, students will be prepared for an entry level position in the IT field or continue their education in computer programming.

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

Complete (2) TWO CREDITS:

- 110110 Computer Literacy OR
060112 Digital Literacy
- 110251 Computational Thinking

Choose (2) TWO CREDITS from the following:

- 110201 Programming Introduction (KCTCS recommends JavaScript)
- 110202 C++1
- 110205 JAVA
- 110207 Visual Basic
- 110809 JavaScript
- 110206 JAVA II
- 110208 Visual Basic II
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

Computer Programmer
Software Developer
Database Administrator
Computer Hardware Engineer
Computer Systems Analyst
Computer Network Architect
Web Developer
Information Security Analyst
Computer Systems Manager
Information Systems Manager
Project Manager

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

COMPUTER SCIENCE

CIP 11.0701.01

PATHWAY DESCRIPTION: The Computer Science Pathway courses focus on computer theory, computing problems and solutions, and design of computer systems and user-interfaces. The coursework will include instruction in the principles of computational science, computer development and programming and applications to a variety of end use situations.

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (1) **ONE CREDIT** from the following:*

- 110110 Computer Literacy OR
060112 Digital Literacy
- 110710 Introduction to Computer Science
(NEW Course 2015-2016) (May be taken in place of Computer Literacy if proficiency has been demonstrated)

*Complete (1) **ONE CREDIT** from the following:*

- 110251 Computational Thinking
- 110205 JAVA
- 110711 Computer Science Principles (NEW Course 2015-2016)
- 110730 Computer Science and Software Engineering (***PLTW***)
(PLTW CS Pathway will be completed for full pathway implementation 2018-2019)

Note: PLTW courses require an agreement between Project Lead The Way and the Local School District; please see the link to [PLTW Program Requirements](#) for further information

*Choose (2) **TWO CREDITS** from the following:*

- 110701 AP Computer Science A
- 110202 C++I
- 110207 Visual Basic
- 110809 JavaScript
- 110206 JAVA II
- 110208 Visual Basic II
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

Software Developer
Database Administrator
Computer Hardware Engineer
Computer Systems Analyst
Computer Network Architect
Web Developer
Information Security Analyst
Computer Programmer
Computer Systems Manager
Information Systems Manager
Project Manager

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

INFORMATICS PATHWAY

CIP 11.0802.00

PATHWAY DESCRIPTION: Students will apply software systems such as Excel, Access and other industry software to acquire, collect, store and communicate data in meaningful ways to clients. Students will manage projects, work in teams, think critically, solve problems and propose solutions to design problems. Further, they will learn to apply literacy, mathematics and science concepts and use technology to effectively solve real-world challenging problems. Through project-based learning, students will explore the future of informatics and learn those habits of behavior and mind unique to professionals in the field. Informatics leverages technology, data and communication by instilling in a new generation the knowledge, imagination and flexibility to tackle complex issues successfully in a data-rich digital world. It is the process of designing systems that take raw data and convert it into new knowledge that can be applied to any field while considering the impact on individuals, organizations and society. **THIS IS A PATHWAY SPECIFIC TO THE SOUTHERN REGION EDUCATION BOARD (SREB). EACH COURSE REQUIRES TEACHER SUMMER TRAINING BEFORE IMPLEMENTATION.**

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (4) **FOUR CREDITS** in the following:*

- 111001 Computer, Networks and Databases **(SREB)**
- 111002 Design for the Digital World **(SREB)**
- 111003 Databases in the Cloud **(SREB)**
- 111004 Developing a Cloud Presence **(SREB)**
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

Note: (SREB) courses require an agreement between the Southern Region Education Board and the District. Please see the link to [SREB](#) for further information.

Bioinformaticist
Data Mapper
Chemical Informaticist
Database Designer
Digital Artist
Human-Computer Interface Designer
Information Architect
Usability Analyst
Interaction Designer
System Integrator
Web Designer
Software Engineer
Project Manager
Informatics Support

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

WEB DEVELOPMENT AND ADMINISTRATION PATHWAY

CIP 11.0801.01

PATHWAY DESCRIPTION: The Web pathway courses involve creating, designing and producing interactive multimedia products and services. This will include development of digitally-generated or computer-enhanced media, and the adherence to web standards, as used in business, training, communications and marketing. Organizations of all types and sizes use digital media, web pages, and websites to communicate with existing and potential customers, to track transactions, and to collaborate with colleagues. This pathway will prepare students to enter the workforce ready to participate as leaders in a broad range of careers and further their education. The courses for this pathway are designed to build on each other and should be taken in the order specified.

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (3) **THREE CREDITS** from the following:*

- 110110 Computer Literacy OR 060112 Digital Literacy
- 110801 Web Page Development
- 110804 Web Site Design and Production

*Choose (1) **ONE CREDITS** from the following:*

- 110213 Computer Graphics
- 110917 Internet Technologies
- 110251 Computational Thinking
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

Internet Project Manager
IT Education Teacher
Webmaster
Web Administrator
Web Developer
Web Graphic Designer
Web
Programmer/Analyst

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

DIGITAL DESIGN & GAME DEVELOPMENT

CIP 36.0113.00

PATHWAY DESCRIPTION: The digital design/gaming pathway courses provide students with a thorough understanding of techniques for designing advanced 3D games and simulations. The courses will cover 2D and 3D graphics, animation, character development, texturing, scripting, program design and coding, and game setup using state-of-the-art software development tools. Completing students will have developed the skills necessary to create 3D graphics and simple applications that can be used for games and simulations.

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (1-2) **ONE -- TWO CREDITS** from the following:*

- 113605 Game Design Principles (NEW Course 2015-2016)
- 110110 Computer Literacy OR
060112 Digital Literacy

*Choose (2-3) **TWO – THREE CREDITS** from the following:*

- 113601 Introduction to Digital 3D Game Graphics
- 113602 Game & Engine Development, Animation, (Photoshop)
- 113603 Advanced 3D Game Development
- 110201 Programming Introduction
- 110251 Computational Thinking
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

Internet Project Manager
IT Education Teacher
Web Animator
Design Artist
Cartoonist
Game Designer
Game Design Analyst
Webmaster
Web Developer
Web Graphic Designer

INFORMATION TECHNOLOGY CAREER PATHWAYS 2015-2016

INFORMATION SUPPORT AND SERVICES PATHWAY CIP 47.0104.01

PATHWAY DESCRIPTION: The Information Support and Services pathway focuses on the design of computing systems. The courses include instruction in the principles of computer hardware & software components, algorithms data basis, telecommunications, etc. Any course not found under this career major/sub code may be found in another career major/sub code within this program area.

BEST PRACTICE CORE	EXAMPLE ILP-RELATED CAREER TITLES
<p><i>Foundational Skills Necessary for Career-Ready Measure: (KOSSA/Industry Certification)</i></p> <p><i>Complete (3) THREE CREDITS from the following:</i></p> <ul style="list-style-type: none"> • 110110 Computer Literacy <u>OR</u> 060112 Digital Literacy • 110101 Computer Hardware and Software Maintenance • 110102 Help Desk Operations <p><i>Choose (1) ONE CREDIT from the following:</i></p> <ul style="list-style-type: none"> • 110302 Management of Support Services (previously Help Desk II) • 110917 Internet Technologies • 110918 Information Technology Co-op <u>OR</u> 110919 Information Technology Internship 	<p>Computer Technician</p> <p>Customer Service Representative</p> <p>Data Entry Technician</p> <p>Electronics Technician</p> <p>Quality Assurance Tester</p> <p>Technical Support</p> <p>Help Desk Associate</p> <p>Technical Writing Clerk</p>

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

GEOGRAPHIC INFORMATION SYSTEMS PATHWAY

CIP 45.0702.00

PATHWAY DESCRIPTION: The GIS pathway is built on a foundation of computer-aided mapping and surveying technology for collecting spatial data, database generation and manipulation for tabular data, and GIS specific courses for organization, analysis and reporting. Students will create maps that identify quantities and/or densities, analyze what's inside or near a study area and indicate change.

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (4) **FOUR CREDITS** from the following:*

- 110110 Computer Literacy OR 060112 Digital Literacy
- 110107 Introduction to GIS – ArcView
- 110315 GIS Software Tools and Applications
- 110316 Special Topics in GIS
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

GIS Technician
Project Manager

Computer
Programmer

Database
Administrator

System
Administrator,
Cartographic
Designer

Business
Development

Related Managerial
& Administrative
Roles

Surveyor

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

NETWORK ADMINISTRATION PATHWAY

CIP 11.0901.01

PATHWAY DESCRIPTION: The networking pathway courses will help students learn new administration support skills or upgrade existing computer information systems skills. Students will be able to properly install networking software on an appropriately sized computer, configure the software for a simple server environment and connect it correctly to a physical network, manage a simple networking environment, effectively troubleshooting common problems, adding new users and attending to security concerns, work within the ethical and professional parameters in the field of network administration.

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (4) **FOUR CREDITS** from the following:*

- 110110 Computer Literacy OR 060112 Digital Literacy
- 110101 Computer Hardware and Software Maintenance
- 110901 Introduction to Networking Concepts
- 110251 Computational thinking
- 110917 Internet Technologies
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

Network Server Administrator
Support Team Member
Quality Assurance System Analyst
Sales Representative
Technical Support Rep.
Technical Writing Expert
Electronics Engineer
Hardware Engineer
System Administrator
Network Administrator

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

NETWORK ADMINISTRATION “MCSA” PATHWAY

CIP 11.1001.00

PATHWAY DESCRIPTION: The MCSA pathway courses will help students learn new Microsoft server administration support skills or upgrade existing computer information systems skills. Students will be able to properly install Microsoft server software on an appropriately sized computer, configure the software for a simple server environment and connect it correctly to a physical network, manage a simple networking environment, effectively troubleshooting common problems, adding new users and attending to security concerns, work within the ethical and professional parameters in the field of Microsoft Server Administration. Students working in this pathway will work toward the MCSA certification.

BEST PRACTICE CORE

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (4) **FOUR CREDITS** from the following:*

- 110110 Computer Literacy OR 060112 Digital Literacy
- 110101 Computer Hardware and Software Maintenance
- 110901 Introduction to Networking Concepts
- 110913 MS Client/Server Configuration
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

EXAMPLE ILP-RELATED CAREER TITLES

Microsoft Server Administrator

Microsoft server admin.
Support team member

Electronics Engineer

Hardware Engineer

System Administrator

Quality Assurance System Analyst

Sales Representative

Technical Support Rep.

Technical Writing Expert

Security Expert

INFORMATION TECHNOLOGY CAREER PATHWAYS 2015-2016

NETWORK ADMINISTRATION CISCO PATHWAY CIP 11.1002.00

PATHWAY DESCRIPTION: The CISCO pathway courses will help students learn new CISCO network administration support skills or upgrade existing computer information systems skills. Students will be able to properly install CISCO software on an appropriately sized computer, configure the software for a simple server environment and connect it correctly to a physical network, manage a simple networking environment, effectively troubleshooting common problems, adding new users and attending to security concerns, work within the ethical and professional parameters in the field of CISCO Network administration.

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (4) **FOUR CREDITS** from the following:*

- 110110 Computer Literacy OR 060112 Digital Literacy
- 110101 Computer Hardware and Software Maintenance
- 110902 Network Fundamentals CISCO I
- 110903 Routing Protocols and Concepts CISCO II
- 110904 LAN Switching and Wireless Scaling
Networks CISCO III
- 110905 Accessing the WAN & Connecting
Networks CISCO IV
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

Cisco Network Administrator
Cisco Engineer
Cisco Hardware Engineer
Cisco System Administrator
Quality Assurance System Analyst
Sales Representative
Technical Support Rep.
Technical Writing Expert
Security Expert

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

NETWORK SECURITY PATHWAY

CIP 11.1003.00

PATHWAY DESCRIPTION: The Network Administration pathway specializing in Security courses will help students be able to properly design and install a wired LAN, including all network devices, physically connect servers and desktop computers, properly design and install a wireless LAN including all network devices, and make physical LAN connections for servers and desktop computers, integrate the Wireless LAN with the wired LAN and work within the ethical and professional parameters in the Computer Networking profession. Students will be a team member, learn new network administration support skills and upgrade existing computer information system skills. Students in this pathway will work towards the Security + certification.

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Choose (4) **FOUR CREDIT** from the following:*

- 110110 Computer Literacy OR 060112 Digital Literacy
- 110101 Computer Hardware and Software Maintenance
- 110901 Introduction to Networking Concepts
- 110912 Security Fundamentals
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

Networking Security Administrator

Electronics Security Engineer

Hardware Security Engineer

System Security Administrator

Quality Assurance System Security Analyst

Security Expert

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

NAF COMPUTER PROGRAMMING PATHWAY

CIP 11.0201.88

PATHWAY DESCRIPTION: The NAF Programming Pathway leads to the College and Career Assessment provided through NAF. This pathway provides programming skills as well as information technology concepts introducing students to the basics of hardware and software, examining hardware components including peripherals, connectors, and memory, exploring common operating systems, software applications, and programming languages along with students learning about types of networks and network topology setting up an email client/server connection. Students use Python as a basis for learning general programming skills while learning programming principles by comparing Python to other programming languages solving new problems using knowledge and techniques including both text and graphics/animation programs as well as learn program design, documentation, formal debugging, and testing. Last students cover all aspects of the database life cycle, from collecting, delivering, practicing and translating data into database applications. Students are exposed to contemporary issues such as security, privacy, and technological inequality exploring career opportunities in IT i.e. computer systems, programming and database professionals.

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

Choose **(4) FOUR CREDIT** from the following:

- 110110 Computer Literacy OR 060112 Digital Literacy
(NAF Courses Principles of IT & Computer Systems)
 - 110201 Programming Introduction
(NAF Courses Intro to Programming & Database Design)
- ***Students must complete the four NAF courses to complete the NAF programming pathway. NAF courses are ½ credit courses.**

Choose **(2) TWO CREDITS** from the following:

- 110202 C++1
- 110205 JAVA
- 110207 Visual Basic
- 110809 JavaScript
- 110206 JAVA II
- 110208 Visual Basic II
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

Computer Programmer
Software Developer
Database Administrator
Computer Hardware Engineer
Computer Systems Analyst
Computer Network Architect
Web Developer
Information Security Analyst
Computer Systems Manager
Information Systems Manager
Project Manager

INFORMATION TECHNOLOGY CAREER PATHWAYS

2015-2016

NAF WEB DEVELOPMENT ADMINISTRATION PATHWAY

CIP 11.0801.88

PATHWAY DESCRIPTION: The NAF Programming Pathway leads to the College and Career Assessment provided through NAF. This pathway provides web design skills as well as information technology concepts introducing students to the basics of hardware and software, examining hardware components including peripherals, connectors, and memory, exploring common operating systems, software applications, and programming languages along with students learning about types of networks and network topology setting up an email client/server connection. Students design, build and launch Web sites learning about Web development including HTML coding, usability, design, and Web-based publishing tools. Students determine business requirements, gather Web content, create Web pages, conduct usability testing, launch their Web sites, and plan how to attract traffic. Finally, students take a look at various career opportunities in Web design. Last students cover all aspects of the database life cycle, from collecting, delivering, practicing and translating data into database applications. Students are exposed to contemporary issues such as security, privacy, and technological inequality exploring career opportunities in IT i.e. computer systems, web design and database professionals.

BEST PRACTICE CORE

EXAMPLE ILP-RELATED CAREER TITLES

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Choose (2) **TWO CREDITS** from the following:*

- 110110 Computer Literacy OR 060112 Digital Literacy
(NAF courses **Principles of IT and Computer Systems**)
- 110810 Web Page Development
(NAF Courses **Web Design and Database Design**)

*****Students must complete the four NAF courses to complete the NAF Web Development/Administration pathway. NAF courses are ½ credit courses.**

*Choose (1) **ONE CREDIT** from the following:*

- 110804 Web Site Design and Production

*Choose (1) **ONE CREDIT** from the following:*

- 110213 Computer Graphics
- 110917 Internet Technologies
- 110251 Computational Thinking
- 110918 Information Technology Co-op OR
110919 Information Technology Internship

Internet Project Manager
IT Education Teacher
Webmaster
Web Administrator
Web Developer
Web Graphic Designer
Web Programmer/Analyst

COMPLIMENTARY OR ADVANCED COURSEWORK BEYOND INFORMATION TECHNOLOGY PATHWAY(s)	
Upon completion of a pathway, additional coursework to enhance student learning is encouraged.	
Credits earned in Advanced or Complimentary Coursework “Beyond the Pathway” may not be substituted for pathway courses in order to achieve Preparatory or Completer status.	
110152 Special Topics, Information Support and Services	
110204 Productivity Software (CIT 130)	
110211 Introduction to Database Design (Fundamentals) (CIT 170)	
110252 Special Topics, Programming	
110399 Leadership Dynamics	
110604 Digital 3D Graphics & Special Effects II	
110752 Special Topics, Computer Science	
110810 Flash with ActionScript	
110852 Special Topics, Web Development/Administration	
110906 Network Hardware Installation and Troubleshooting (CIT 260)	
110907 MS Active Directory Server/Server Infrastructure (CIT 214)	
110952 Special Topics, Networking	
JAG Courses	
Career Options	

SAMPLE IT CAREER PATHWAY

KENTUCKY CAREER PATHWAY/PROGRAM OF STUDY TEMPLATE											
COLLEGE/UNIVERSITY:			KCTCS		Recommended Course Sequence						
HIGH SCHOOL (S):			All Participating		CLUSTER: IT						
					PATHWAY: Network Administration						
					PROGRAM: Network Administration - CISCO (Courses below may change)						
			</								

Computer Literacy
Valid Course Code
110110
OR
Digital Literacy
Valid Course Code
060112

Course Description:

Introduces students to the main components of computer literacy including Computer Fundamentals, Key Applications and Living Online. Provides an introduction to the computer and the convergence of technology as used in today's global environment. Introduces topics including computer hardware and software, file management, the Internet, e-mail, the social web, green computing, security and computer ethics. Presents basic use of application, programming, systems and utility software. Basic keyboarding skills are strongly recommended.

Content/Process

Students will:

1. Considering the Computer:
 - a. Identify what a computer does
 - b. Provide a brief history of the computer
 - c. Explain the different types of personal and multiuser computers
 - d. Identify other computer devices such as handheld, mobile, and video game systems
 - e. Identify proper ergonomics to improve comfort and safety of the end user
2. Hardware:
 - a. Identify the CPU, the parts of the system unit and the motherboard
 - b. Briefly describe binary code
 - c. Identify different storage devices
 - d. Highlight different input and output devices and their uses
 - e. Explain the different types of printers
 - f. Describe communication devices and their purpose
 - g. Explain the impact of computers upon society including effects of social technologies, green computing, dangers of excessive use, and disposal of obsolete equipment
 - h. Maintain computer equipment and solve common problems relating to computer hardware
3. File Management:
 - a. Use a graphical user interface-based operating system to manage files, folders and disks
 - b. Create folders to organize files
 - c. Explain file extensions and file properties
 - d. Review the importance of backing up files and how to do it within the operating system
 - e. Demonstrate how to compress files
 - f. Use search possibilities to locate files
 - g. Re-associate files to a different program

4. Application and System Software

- a. Use a course management system
- b. Utilize computer technology as a tool to access, manage, prepare and present information
- c. Identify trends in information processing and new emerging technologies
- d. Identify and analyze ethical issues such as copyright, privacy and security as related to computing
- e. Explain the difference between application, programming, system and utility software
- f. Use application software packages to prepare basic documents, spreadsheets, databases and presentations.
- g. Identify different types of business and personal software
- h. Explain system requirements for installing and using software
- i. Explain licensing, freeware, shareware, open source and retail software
- j. Explain the difference between application and Operating system software
- k. Review different types of system software
- l. Manipulate text and format a document using word processing software
- m. Create worksheets, use basic formulas and create graphs using spreadsheet software.

5. Networking

- a. Describe and explain basic data communications and network technologies and functions
- b. Review the history of the Internet
- c. Explain how networks operate and how to connect to them
- d. Compare different web browsers
- e. Identify different ways to navigate and search the web
- f. Review social networking and its impact on today's society
- g. Review forums, discussion boards, blogs, podcasts, etc.
- h. Review e-commerce and social media marketing
- i. Identify and use basic e-mail and Internet functions and understand their capabilities
- j. Describe globalization and challenges including technological barriers, electronic payments and varying cultures
- k. Describe cloud computing and its impact on business and personal systems

6. Online/Internet

- a. Apply Internet etiquette and safety
- b. Explain the differences between a web browser and a search engine
- c. Navigate a World Wide Web browser
- d. Identify Internet search engines and their advantages and disadvantages
- e. Demonstrate proficiency in the use of the Internet
- f. Discriminate between ethical and unethical use of computers and information
- g. Demonstrate an understanding of copyrights and licensing
- h. Demonstrate an awareness of computer security and a basic understanding of ways to protect a computer (e.g. viruses, Trojans, and Malware)

Connections: Post-Secondary: KCTCS CIT 105 Introduction to Computers
CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
Kentucky Occupational Skill Standards
Secretary's Commission on Achieving Necessary Skills (SCANS)
Common Core State Standards ELA, Math & Science
21st Century Skills
Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Computer Hardware & Software Maintenance
Valid Course Code
110101

Course Description: Focuses on the design of computing systems, including instruction in the principles of computer hardware and software components, algorithms data basis, telecommunications, etc. Includes the knowledge to identify and explain PC components, setup a basic PC workstation, conduct basic software installation, identify compatibility issues and recognize/prevent basic security risks and also gives knowledge in the areas of Green IT and preventative maintenance of computers.

Content/Process

Students will:

1. Hardware Basics
 - a. Identify basic IT Vocabulary (e.g., RAM, processor speed/cores, hard drives, networking)
 - b. Demonstrate the proper use of hardware devices
 - c. Explain the characteristics and functions of internal and external storage devices
 - d. Explain the characteristics, installation, configuration, troubleshooting, upgrading and functions of peripheral devices
 - e. Explain the characteristics and functions of core input devices
 - f. Demonstrate the ability to set up a basic PC workstation
 - g. Identify the steps to install, configure, optimize, and upgrade personal computer components and peripherals
2. Compatibility Issues and Common Errors
 - a. Identify basic compatibility issues
 - b. Recognize common operational problems caused by hardware or software
 - c. Demonstrate the ability to minimize risks
 - d. Isolate and identify computer problems using visual/audible inspection of components and follow appropriate troubleshooting procedures (e.g., status lights, beep codes, visual inspection of circuitry)
 - e. Access needed information using company and manufacturer's references to fix common errors
 - f. Define fault tolerance, disaster recovery, and various backup types/backup media (e.g. RAID levels)
3. Software (Application and Operating System) Installation and Functions
 - a. Identify the steps to install, configure, optimize, remove, upgrade, and recover software.
 - b. Identify issues related to folder and file management
 - c. Explain the function and purpose of software tools including imaging software
 - d. Identify software tools, diagnostic procedures, and troubleshooting techniques for computer components and operating Systems
 - e. Identify the steps to use Control panel applets and Task Manager for system management
 - f. Identify the steps to configure and troubleshoot remote access and connections
 - g. Convert among decimal, binary and hexadecimal number systems

4. Application Support
 - a. Explain troubleshooting guidelines and tools to support users configuring, customizing and running applications including email servers.
 - b. Identify hardware requirement as they relate to compatibility and troubleshooting of software applications
 - c. Explain how to backup client files
 - d. Identify the steps to configure and troubleshooting application access on a network
5. Compare and contrast client operating systems and their features.
 - a. Windows version history, types, files and features
 - b. Identify locations, purposes, and characteristics of operating system files
6. Security
 - a. Recognize basic security risks
 - b. Identify prevention methods
 - c. Identify access control methods
 - d. Identify security threats
 - e. Recognize security breaches and ways to resolve them.
7. Green IT and Preventive Maintenance
 - a. Identify environmentally sound techniques to preserve power and dispose of materials.
 - b. Identify green techniques, equipment and procedures
 - c. Identify preventative maintenance products, techniques, and how to use them.
8. Describe and apply appropriate operational procedures including safety, environmental procedures, good communication skills, and professional behavior.
 - a. Safety
 - b. Environmental procedures
 - c. Communication skills
 - d. Professionalism in the workplace
9. Portable Computing Devices
 - a. Identify the steps to install, configure, upgrade, and support laptops/portable devices and identify the names, purposes, and characteristics of mobile computer systems.
 - b. Explain appropriate use for mobile specific communications
 - c. Identify major components of portable devices (e.g. parts of LCD)
 - d. Use Troubleshooting Techniques to diagnose and repair Portable Devices
10. Networking
 - a. Describe, identify and implement basic physical networking components and concepts (e.g. cables, connectors, connections types, network devices, server, switch, router, access point, port identification, and usage)
 - b. Install, configure, and troubleshoot network interfaces and manage wired/wireless connections including IP configuration
 - c. Utilize command line functions and utilities to diagnose and troubleshoot network connection issues.
 - d. Share resources such as files and printers among multiple computers
 - e. Recognize threats to a home network and identify ways to implement security protocols

Connections

Post-Secondary: KCTCS CIT 111 Computer Hardware and Software

CTSO's – SkillsUSA, FBLA; (STLP encouraged even though not a recognized student organization for program review)

Kentucky Occupational Skill Standards

Secretary's Commission on Achieving Necessary Skills (SCANS)

Common Core State Standards ELA, Math & Science

21st Century Skills

Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Computational Thinking
Valid Course Code
110251

Course Description:

Students analyze the structure of the worldwide web, apply basic principles of web documents and HTML, and develop multi-media web pages. Course content will include the understanding of hypertext and web structures. Equipment such as scanners, digital and video cameras and sound recording devices will be utilized through hands-on instruction. Promotes understanding of computer programming and logic by teaching students to "think like a computer". Covers skills needed to develop and design language-independent solutions to solve computer related problems. Covers developmental and design basics including use of variables, control and data structures, and principles of command-line and object-oriented languages.

Content/Process

Students will:

- 1 Demonstrate an understanding of elementary logic, truth tables, and Boolean Algebra VI. Making Decisions: Boolean Algebra - AND, OR, and NOT; Decision statements: single, multiple, and nested
- 2 Demonstrate programming style best practices.
- 3 Effectively present a precise and accurate written communication using proper grammar, spelling, punctuation, etc., Demonstrate the ability to work as a team member as well as using conflict resolution techniques,
- 4 Demonstrate correct use of computer terminology and ethical usage of software and hardware, Demonstrate ethical behavior in the workplace: e.g. non-harassment, honesty, non-discrimination, professionalism, etc., Prepare resume, letter of application and participate in an interview, Implement new process steps given oral instructions.
- 5 Illustrate the flow of a program: III. Program Design Tools; Flowcharting, Pseudo-code IV. Control Structures; Sequence, Repetition, Selection: V. Modularity; Modules, Arguments, parameters, pass-by-value and pass-by-reference
- 6 Illustrate concepts using one or more programming language(s).
- 7 Explain the implications of file processing: II. Data Types and Variables, Data types - integers, reals, characters, strings, Booleans, Variables, literals, and constants, Variable scope
- 8 Describe the steps addressed in the design of a program to solve the stated problem: III. Program Design Tools; Flowcharting, Pseudo-code
- 9 Describe the principles of object-oriented programming; I. An Overview of Computers and Logic; Procedural vs. object-oriented programming, Compilers and interpreters, Binary and hexadecimal numbers, Documentation - internal

and external

- 10 Develop algorithms with increasing degree of complexity using structured programming techniques such as: sequence, selection, and repetition; IX. Other, File usage, Searching algorithms, Sorting algorithms
 - 11 Use fundamental data types and data structures such as: integers, reals, characters, strings, Booleans, one-and two-dimensional arrays; II. Data Types and Variables, Data types - integers, reals, characters, strings, Booleans, Variables, literals, and constants Variable scope. VIII. Array Processing; Single dimension arrays, Multi-dimensional arrays
 - 12 Analyze the binary representation of data; I. An Overview of Computers and Logic, Procedural vs. object-oriented programming, Compilers and interpreters, Binary and hexadecimal numbers, Documentation - internal and external
 - 13 Use modular programming; V. Modularity: Modules, Arguments, parameters, pass-by-value and pass-by-reference; VII. Looping: Pre and post test, Counter controlled, Nested
 - 14 Identify potential safety hazards and take preventative action.
 - 15 Use Material Safety Data Sheets (MSDS) or equivalent documentation and appropriate equipment documentation.
 - 16 Identify potential hazards and implement proper safety procedures including ESD precautions and procedures, safe work environment and equipment handling.
 - 17 Use good communication skills including listening and tact/discretion, when communicating with customers and colleagues.
 - 18 Use job-related professional behavior including notation of privacy, confidentiality and respect for the customer and customers' property.
 - 19 Demonstrate proficiency in use of the Internet.
 - 20 Demonstrate proficiency in a graphics software package.
 - 21 Demonstrate proficiency in a word processing package.
 - 22 Demonstrate proficiency in a spreadsheet package.
 - 23 Describe common applications of a database.
 - 24 Apply work site and lab safety procedures, Apply personal safety rules and procedures, Apply fire prevention rules and procedures, Demonstrate accountability of and the safe and careful use of company equipment, machines etc.
- a)** An overview of computers and logic
- a.** Procedural vs. object-oriented programming
 - b.** Compilers and interpreters
 - c.** Binary and hexadecimal numbers

- d. Documentation – internal and external
- b) Data Types and Variables
 - a. Data types – integers, reals, characters, strings, Booleans
 - b. Variables, literals and constants
 - c. Variable scope
- c) Program Design Tools
 - a. Flowcharting
 - b. Pseudo code
- d) Control Structures
 - a. Sequence
 - b. Repetition
 - c. Selection
- e) Modularity
 - a. Modules
 - b. Arguments, parameters, pass-by-value and pass-by-reference
- f) Making Decisions
 - a. Boolean Algebra – AND, OR and NOT
 - b. Decision statements: single, multiple and nested
- g) Looping
 - a. Counter controlled
 - b. Nested
- h) Array Processing
 - a. Single dimension arrays
 - b. Multi-dimensional arrays
- i) Files and Algorithms
 - a. File usage
 - b. Searching algorithms
 - c. Sorting algorithms

Connections

Post-Secondary: KCTCS CIT 120 Computational Thinking
 CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
 Kentucky Occupational Skill Standards
 Secretary's Commission on Achieving Necessary Skills (SCANS)
 Common Core State Standards ELA, Math & Science
 21st Century Skills
 Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Programming Introduction (e.g., JAVA, C++, C#, Visual Basic)
Valid Course Code
110201

Course Description: Focuses on the general writing and implementation of generic and atomized programs to drive operating systems. Includes software design, languages, and program writing, trouble-shooting, etc. Introduces students to fundamental programming concepts using an industry-specific or emerging programming language. Includes data types, control structures, simple data structures, error-handling, modular programming, information and file processing, and uniqueness of the language used in the course.

Content/Process

Students will:

1. Demonstrate knowledge of the program development life cycle.
 - a. Program Development Life Cycle
 - b. Steps in life cycle
 - c. Using the life cycle
2. Design, develop, compile, debug, test, run, and document programs in the language studied.
 - a. Software Development
 - b. Write code
 - c. Compile code
 - d. Debug code
 - e. Test code
 - f. Execute code
 - g. Document
3. Design and develop programs using operators and assignments.
 - a. Operators and Assignments
 - b. Assignment operators
 - c. Arithmetic operators
 - d. Relational operators
 - e. Logical operators
 - f. Compound operators
 - g. Data type casting
4. Design and develop programs that properly use variable, constants, data types, and objects.
 - a. Memory and Processor Usage
 - b. Variables
 - c. Constants
 - d. Primitive data types
 - e. Objects
5. Design and develop programs that use sequence, selection, and repetition structures.
 - a. Control Structures
 - b. Sequence
 - c. Selection
 - d. Repetition
6. Design and develop programs that use simple data structures.
 - a. Data structures
 - b. Single-dimension arrays
 - c. Multi-dimension arrays

- d. Other data structures unique to the language
- 7. Design and develop programs that use effective error and exception handling.
 - a. Errors
 - b. Type of errors
 - c. Error handling
 - d. Exception handling
- 8. Design and develop programs that implement user-defined methods and modular programming.
 - a. Structured Programming
 - b. User-defined modules
 - c. Built-in methods and modules
- 9. Design and develop programs that implement file processing.
 - a. File Processing
 - b. Standard input and output devices
 - c. Reading from files
 - d. Writing to files
- 10. Design and develop programs that implement fundamental features that are unique to the language studied.
 - a. Unique Concepts of Language
 - b. Methods
 - c. Features
- 11. Design and develop programs using object oriented programming features, if applicable to the language studied.
 - a. Object-Oriented Programming (if applicable to the language)
 - b. Classes
 - c. Objects
 - d. Instantiation
- 12. Evaluate and critique effectiveness and efficiency of code written.
 - a. Evaluation of Programming
 - b. Effectiveness of code
 - c. Efficiency of code

Connections

Post-Secondary:

CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)

Kentucky Occupational Skill Standards

Secretary's Commission on Achieving Necessary Skills (SCANS)

Common Core State Standards ELA, Math & Science

21st Century Skills

Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Web Page Development
Valid Course Code
110801

Course Description: Web Page Design using HTML will be introduced. Creating web documents using a simple text editor will be the main focus. How to use a simple web editor will also be covered. Features such as layout, tables, images, forms, frames and the incorporation of sound and video will be explored. Developing site specifications and methods to increase the appeal and effectiveness of web sites are included. How to prepare web documents appropriate for use in business and professional web sites will be covered. Also, this course introduces CSS and emphasizes W3C web design and accessibility standards.

Content/Process

Students Will:

1. Plan the layout of a website.
 - a. How to storyboard a web page/site
 - b. The use of templates in page/site design
 - c. Accessibility standards
 - d. Browser compatibility
 - e. File management
2. Use HTML (Hypertext Markup Language)
 - a. Overview of HTML and Vocabulary
 - b. Compare HTML & XHTML
 - c. Explore the use of text editors and web creation software
 - d. Nested elements
 - e. Attributes
 - f. Headings
 - g. Paragraphs
 - h. Formatting
 - i. Styles
 - j. Lists
3. Use CSS (Cascading Style Sheets)
 - a. Use inline, embedded and external CSS
 - b. Using CSS selectors and declarations
 - c. Selecting and formatting fonts with CSS
 - d. Text properties with CSS
 - e. Working with headings
 - f. The difference between block and inline level elements
 - g. Color selection and the web color palette
 - h. CSS Class, ID and contextual selectors
 - i. Styling HTML structural elements – header, section, nav, footer
 - j. Using the box model
 - k. Margins and padding with CSS
 - l. Borders with CSS
4. Website Layout
 - a. How to create a text link
 - b. How to create an email link
 - c. The target and name attributes
 - d. Style link with CSS

- e. Opening links in new windows/tabs
 - f. Use IDs and anchors to link to sections on a web page and to multiple web pages
- 5. Use multimedia in the creation of a website (i.e. images, sound and video)
 - a. Image types (JPG, BMP, TFF, PNG, RAW, PSD)
 - b. How to obtain images legally
 - c. Inserting an image
 - d. Image alignment
 - e. Using an image as a background
 - f. Using images as links
 - g. Image maps
 - h. Image captions
 - i. Optimizing a photo for the web
- 6. Use HTML and CSS in page layout
 - a. Creating lists – ordered, unordered and definition lists
 - b. Using tables for page layout
 - c. Using relative and absolute position
 - d. Defining page size
 - e. Using the div element
 - f. Using the float element
 - g. Using overflow
 - h. Using CSS two-column page layout
 - i. CSS interactivity with pseudo-classes
 - j. CSS for print
- 7. Create lists and tables in organizing content
 - a. Table elements – rows, cells and headers
 - b. Spanning rows and columns
 - c. Style a table with CSS
- 8. Create web forms
 - a. Form elements
 - b. Submit and reset buttons
 - c. Checkbox and radio buttons
 - d. Hidden fields and password boxes
 - e. Text area element
 - f. Format a form using tables
 - g. Select an option element
 - h. Label element
 - i. Field set and legend elements
 - j. Style a form with CSS
 - k. HTML form controls – data list, search box, calendar control, color picker control
- 9. Use multimedia in the creation of a website (i.e. images, sound, video)
 - a. Configure sound and video
 - b. Audio, video and flash with the object element
 - c. HTML audio, video, and embed elements
 - d. Web publishing basics
 - e. Registering a domain name
 - f. Choosing a web host
 - g. Publish with File Transfer Protocol (FTP) and other file transfer tools
 - h. Search engine submission and optimization
 - i. Accessibility and usability testing

Connections

Post-Secondary: KCTCS CIT 155: Web Page Development

CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)

Kentucky Occupational Skill Standards

Secretary's Commission on Achieving Necessary Skills (SCANS)

Common Core State Standards ELA, Math & Science

21st Century Skills

Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Web Site Design and Development
Valid Course Code
110804

Course Description:

This course gives the student an experience with advanced topics in planning and implementing a professional web site. Emerging technologies will be explored in creating interactive web pages that incorporate cascading style sheets, DHTML, JavaScript and multimedia and graphics. Designing for a cross-browser web site and different monitor resolutions should be covered. Introduces web site production processes with emphasis on design involving layout, navigation, interactivity and using web production software.

Content/Process

Students Will:

1. Utilize principles of graphic and content creation for online media
 - I. Production Tools
 - A. HMTL approaches
 - B. HTML and interactive editors
 - C. Graphics applications
 - D. Multimedia applications
 - II. Pre-Production Process
 - A. Project definition and planning
 - B. Functional requirements
 - C. Content and media assets organization
 - D. Basic project management concepts
 - E. Production phases.
2. Use fundamental online graphic design principles including appropriate interactivity, content sensitive navigation schemes and user interface criteria.
 - III. Layout and Design
 - A. The web as a medium
 - B. Web design principles
 - C. Web design issues
 - D. Separation of content and format
 - E. Other design issues
 - IV. User Interface Design
 - A. User interface definition
 - B. Interface design basics
 - C. Interface usability
 - D. Navigation design basics
 - E. Navigation usability
3. Select task-appropriate software tools
4. Utilize web site accessibility.
 - V. Accessibility and internationalization
 - A. Accessibility
 - B. Localization and translation
 - VI. Media Creation
 - A. Image creation

- B. Image manipulation
- C. Digital video
- VII. Interactivity
 - A. Appropriate interactivity
 - B. Interactive elements
 - C. User-by-user interactivity
- VIII. Testing and Optimization
 - A. Site clean-up and testing
 - B. Error checking
 - C. Speed optimization
 - D. Web site management
 - E. Web site maintenance
 - F. Usability testing

5. Utilize web site implementation and hosting.

- IX. Implementation and Hosting
 - A. Client sign-off
 - B. Legal review
 - C. File publishing to the web

6. Edit and enhance digital video images using appropriate software.

Connections

Post-Secondary: KCTCS CIT 157: Web Site Design & Production

CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)

Kentucky Occupational Skill Standards

Secretary's Commission on Achieving Necessary Skills (SCANS)

Common Core State Standards ELA, Math & Science

21st Century Skills

Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Advanced Placement Computer Science A
Valid Course Code
110701

Course Description: The Advanced Placement Program enables willing and academically prepared students to pursue college level studies – with the opportunity to earn college credit, advanced placement, or both – while still in high school; AP Exams are given each year in May. Students who earn a qualifying score on an AP Exam are typically eligible to receive college credit and/or placement into advanced courses in college. Every aspect of AP course and exam development is the result of collaboration between AP teachers and college faculty. They work together to develop AP courses and exams, set scoring standards, and score the exams. College faculties review every AP teacher’s course syllabus.

Content/Process

Students will:

1. Design, implement, and analyze solutions to problems;
2. Use and implement commonly used algorithms;
3. Develop and select appropriate algorithms and data structures to solve new problems;
4. Write solutions fluently in an object-oriented paradigm;
5. Write, run, test, and debug solutions in the Java programming language, utilizing standard Java library classes and interfaces from the AP Java Subset;
6. Read and understand programs consisting of several classes and interacting objects;
7. Read and understand a description of the design and development process leading to such a program;
8. Understand the ethical and social implications of computer use.

Connections

- Post-secondary: KCTCS CIT 105 Introduction to Computers
- CTSOs – SkillsUSA, FBLA (STLP encouraged but not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary’s Commission on Achieving Necessary Skills (SCANS)
- Common Core state Standards ELA, Math & Science
- 21st Century Skills

**Districts that offer the following PLTW Course
must have a Project Lead The Way STEM agreement.
(PLTW CS Pathway will be completed for full pathway implementation 2018-2019)**

(PLTW) courses require an agreement between Project Lead The Way and the Local School District; please see the link to [PLTW Program Requirements](#) for further information.

Computer Science and Software Engineering (PLTW)

Valid Course Code

110730

Course Description: CSE implements the College Board's CS Principles framework. Using Python® as a primary tool and incorporating multiple platforms and languages for computation, this course aims to develop computational thinking, generate excitement about career paths that utilize computing, and introduce professional tools that foster creativity and collaboration. This course can be a student's first course in computer science, although we encourage students without prior computing experience to start with Introduction to Computer Science. CSE helps students develop programming expertise and explore the workings of the Internet. Projects and problems include app development, visualization of data, cybersecurity, and simulation. The course aligns with CSTA 3B standards

Content/Process

Student Will:

1. Algorithms, Graphics, and Graphical User Interfaces

- a. Understand programming and build their algorithmic thinking and ability to use abstraction. Creativity is emphasized as they work with Scratch™, App Inventor, and Python® programming languages to tell graphical stories, publish games and Android™ applications, and explore various development environments and programming techniques.
- b. Create original code and read and modify code provided from other sources. An Agile software development process is emphasized and personal, professional, and collaborative skills take center stage.
- c. Debate policy questions about the ownership and control of digital data and examine implications for creative industries and consumers.
- d. Explore career paths tied to computing

I. Algorithms and Agile Development

- a. Create programs in Scratch incorporation audio and visual elements while working with algorithmic problems.
- b. Explore tools for collaboration and management
- c. Explore conventions of object-oriented programming

II. Mobile App Design

- a. Build skills analyzing existing code with an emphasis on the roles of variables.
- b. Create an Android app of their design

- c. Explore binary numbers, letters, colors, images etc.
 - 1. Create a physical representation of data storage
- d. Use Inventor programs building ability to analyze a complex program and incorporate event handlers into programs.
- e. Design and create an Android app using pair programming and practicing the Agile software design process.

III. Algorithms in Python

- a. Understand all information as bits and to transfer their understanding of algorithms to *Python*
- b. Understand functional, imperative, and declarative programming paradigms with *Python*

IV. Images and Object-Oriented Libraries

- a. Use object-oriented libraries
- b. Manipulate image files by modifying pixel data and using code libraries to work at higher levels of abstraction
- c. Use a variety of documentation including application-programming interfaces (APIs)
- d. Read, discuss and debate intellectual property issues with digital data; collaborate to create an image processing function i.e. automation.

V. GUIs in Python

- a. Create a graphical user interface considering audience and accessibility
- b. Work with APIs, the Tkinter Canvas for drawing and animation and Tkinter toolbox of GUI widgets
- c. Create a model-view-controller GUI using Scratch or Python

2.The Internet

- a. Use PHP and SQL to structure and access a database hosted on a remote server.
- b. Understand how HTML and CSS direct the client computer to render a page
- c. Explore JavaScript to provide dynamic content
- d. Explore Web languages understanding how languages work together to deliver content
- e. Look at the history of the Internet i.e. issues of security, privacy and democracy
- f. Explore career paths in cyber security, web development and information technology

I. The Internet and the Web

- a. Understand the Internet as a set of computers exchanging bits in the form of packets
- b. Identify the components of their digital footprint
- c. Compare the designs, strengths, and weaknesses of their favorite web pages
- d. Compare results from different search engines and learn to refine their search techniques
- e. Learn to assess the trustworthiness of web-based media and consider the data flow that permits targeted advertisements
- f. Employ appropriate tools to explore the hierarchical nature of DNS and IP
- g. Identify ways that a web developer's decisions affect the user and ways that the user's decisions impact society

II. Shopping and Social on the Web

- a. Understand the role of client-side code, server-side code and databases delivering interactive web content

- b. Compare languages encountered so far to generalize the concepts of sequencing instructions, selection of instructions by conditionals, iteration and the common roles of variables
 - c. Explore and compare career paths within computing
- III. Security and Cryptography
- a. Understand cyber security from the perspectives of the user, the software developer, the business, the nation, and the citizen
 - b. Explore parallel strands in encryption and security

3. Raining Reigning Data

- a. Examine large-scale data collection and analysis
- b. Examine large data sets tied to themselves and to areas of work and society
- c. Employ data visualization techniques working to recognize opportunities to apply algorithmic thinking and automation when considering questions with answers embedded in data

I. Visualizing Data

- a. Create visualizations to analyze sets of large data and to meaningfully interpret the patterns
- b. Draw conclusions about themselves from relevant data, including local weather, the economics of their community, and naming trends with their name
- c. Weigh societal concerns around the collection and persistence of Big Data
- d. Apply *Python* application to make useful graphic representations of data, developing from familiar visualizations to more modern visual analyses like scaled-dot or colorized scatter plots of multidimensional data sets
- e. Utilize basic Excel® spreadsheet programming and cell manipulation

II. Discovering Knowledge from Data

- a. Create a range of visualizations to analyze complex sets of large data and to meaningfully interpret the patterns
- b. Use statistics to deepen the meaning of knowledge gained by visualization
- c. Use Excel and Python to manipulate and visualize data
- d. Examine multidimensional data sets using scatter plot arrays and view geographic and social data using heat maps and directed graphs
- e. Experiment with object recognition and face recognition
- f. discover clustering and linear correlation patterns lurking in data sets distributed across student computers and school sites, such that data cleaning and warehousing are necessary

4. Intelligent Behavior

- a. Galvanize the connections among computing concepts and between computing and society
- b. Identify problems and questions that can be addressed with computer simulation, incorporating agent-based modeling
- c. Explore the assumptions and parameters built into several simulations and to attach meaning to the results
- d. Reflect on the current and future state of artificial intelligence

I. Moore's Law and Modeling

- a. Construct an understanding of how the explosion of technology over the last two decades has impacted every realm of study and employment
- b. Research the impact of computer modeling and simulation which have been made possible by the rapid increase in computational power due to the continued applicability of Moore's Law

- c. Manipulate discrete electronic components to create logic gates and create comparable results using integrated circuits to get a feel for what it means to double the number of transistors that can fit in a given area
- d. Explore simulation in NetLogo directly by manipulating a model of predation and a model of the spread of viruses in humans
- e. Examine the code of ethics for simulationists and reflection on the necessity of adhering to such a code

II. Intelligent Agents

- a. Experiment with materials designed to illuminate the rise of intelligent and complex behavior from simple rules and seemingly unintelligent agents
- b. Manipulate models of neurons and neural networks
- c. Design and conduct their own experiments on a model of their own choosing using Monte Carlo methods
- d. Explore the generation and observation of fractals and study a diffusion limited aggregation model for producing fractal behavior
- e. Choose a tool or tools that they have learned about in the course and apply their knowledge to create a novel product of their own design
- f. Present their product to their class along with reflections about how it is tied to everything they've learned about computer science

Connections

- Post-secondary: KCTCS CIT 105 Introduction to Computers
- CTSOs – SkillsUSA, FBLA (STLP encouraged but not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core state Standards ELA, Math & Science
- 21st Century Skills

Introduction to Computer Science
Valid Course Code
110710

Course Description: Introduction to Computer Science is designed to introduce students to the breadth of the field of computer science through an exploration of engaging and accessible topics. Rather than focusing the entire course on learning particular software tools or programming languages, the course is designed to focus on the conceptual ideas of computing and help students understand why certain tools or languages might be utilized to solve particular problems. The goal of the course is to develop in students the computational practices of algorithm development, problem solving and programming within the context of problems that are relevant to the lives of today's students. Students will also be introduced to topics such as interface design, limits of computers, and societal and ethical issues.

Content/Process

Students will :

1. Human Computer Interaction.

- a. Analyze the characteristics of hardware components to determine the applications for which they can be used;
- b. Use appropriate tools and methods to execute Internet searches which yield requested data;
- c. Evaluate the results of web searches and the reliability of information found on the Internet;
- d. Explain the differences between tasks that can and cannot be accomplished with a computer;
- e. Analyze the effects of computing on society within economic, social, and cultural contexts;
- f. Communicate legal and ethical concerns raised by computing innovation;
- g. Explain the implications of communication as data exchange.

2. Problem Solving.

- a. Name and explain the steps they use in solving a problem;
- b. Solve a problem by applying appropriate problem-solving techniques;
- c. Express a solution using standard design tools;
- d. Determine if a given algorithm successfully solves a stated problem;
- e. Create algorithms that meet specified objectives;
- f. Explain the connections between binary numbers and computers;
- g. Summarize the behavior of an algorithm;
- h. Compare the tradeoffs between different algorithms for solving the same problem;
- i. Explain the characteristics of problems that cannot be solved by an algorithm.

3. Introduction to Programming.

- a. Use appropriate algorithms to solve a problem;
- b. Design, code, test, and execute a program that corresponds to a set of specifications;
- c. Select appropriate programming structures;
- d. Locate and correct errors in a program;
- e. Explain how a particular program functions;
- f. Justify the correctness of a program;
- g. Create programs with practical, personal, and/or societal intent.

4. Computing and Data Analysis.

- a. Describe the features of appropriate data sets for specific problems;
- b. Apply a variety of analysis techniques to large data sets;
- c. Use computers to find patterns in data and test hypotheses about data;
- d. Compare different analysis techniques and discuss the tradeoffs among them;

- e. Justify conclusions drawn from data analysis.

5. Societal Impacts

- a. Describe ways in which computing enables innovation;
- b. Discuss the ways in which innovations enabled by computing affect communication and problem solving;
- c. Analyze how computing influences and is influenced by the cultures for which they are designed and the cultures in which they are used;
- d. Analyze how social and economic values influence the design and development of computing innovations.
- e. Discuss issues of equity, access, and power in the context of computing resources;
- f. Communicate the legal and ethical concerns raised by computational innovations;
- g. Discuss privacy and security concerns related to computational innovations;
- h. Explain positive and negative effects of technological innovations on human culture.

Connections

- Post-Secondary:
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Computer Science Principles
Valid Course Code
110711

Course Description: Computer Science Principles is designed to introduce students to the central ideas of computer science, to instill ideas and practices of computational thinking, and to have students engage in activities that show how computing changes the world. The course is rigorous and rich in computational content, includes computational and critical thinking skills, and engages students in the creative aspects of the field. Through both its content and pedagogy, this course aims to appeal to a broad audience.

Content/Process

Students will:

1. Creativity.

- a. The student will use computing tools and techniques to create artifacts;
- b. collaborate in the creation of computational artifacts;
- c. analyze computational artifacts; use computing tools and techniques for creative expression;
- d. use programming as a creative tool.

2. Abstraction.

- a. The student can describe the combination of abstractions used to represent data,
- b. explain how binary sequences are used to represent digital data,
- c. develop an abstraction,
- d. use multiple levels of abstraction in computation,
- e. use models and simulations to raise and answer questions.

3. Data.

- a. The student can use computers to process information to gain insight and knowledge;
- b. collaborate when processing information to gain insight and knowledge;
- c. communicate insight and knowledge gained from using computer programs to process information;
- d. use computing to facilitate exploration and the discovery of connections in information;
- e. use large data sets to explore and discover information and knowledge;
- f. analyze the considerations involved in the computational manipulation of information.

4. Algorithms.

- a. The student can develop an algorithm designed to be implemented to run on a computer;
- b. express an algorithm in a language;
- c. appropriately connect problems and potential algorithmic solutions;
- d. evaluate algorithms analytically and empirically.

5. Programming.

- a. The student can explain how programs implement algorithms;
- b. use abstraction to manage complexity in programs;
- c. evaluate a program for correctness;
- d. develop a correct program;
- e. collaborate to solve a problem using programming;
- f. employ appropriate mathematical and logical concepts in programming.

6. Internet.

- a. The student can explain the abstractions in the Internet and how the Internet functions;
- b. Explain characteristics of the Internet and the systems built on it;
- c. analyze how characteristics of the Internet and systems built on it influence their use;
- d. connect the concern of cybersecurity with the Internet and the systems built on it.

7. Impact.

- a. The student can analyze how computing affects communication, interaction, and cognition;
- b. collaborate as part of a process that scales;
- c. connect computing with innovations in other fields;
- d. analyze the beneficial and harmful effects of computing;
- e. connect computing within economic, social, and cultural context.

Connections

- Post-Secondary:
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

References:

[1] The College Board AP® Computer Science Principles Draft Curriculum Framework (2013).

Retrieved June 23, 2014,

from <http://media.collegeboard.com/digitalServices/pdf/ap/2013-0607-comp-sci-principles-cf-final.pdf>

[2] College Board Computer Science Principles: Learning Objectives (2013). Retrieved June 23, 2014,

<https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbXJc3ByaW5jaXBsZXNwaWxvdGlpfGd4OjI0ZTY>

Introduction to Networking Concepts
Valid Course Code
110901

Course Description: Introduces technical level concepts of non-vendor specific networking including technologies, media, topologies, devices, management tools, and security. Provides the basics of how to manage, maintain, troubleshoot, install, operate, and configure basic network

Students will:

1. Networking Fundamentals
 - a. Understand types of networks and utilize basic networking terms.
 - b. Understand Network Concepts in Historical Context.
 - c. Demonstrate how to configure and connect network devices. (e.g. computers, printers, routers, switches, connectors)
 - d. Understand the advantages to sharing resources through network devices.
 - e. Differentiate between the different types of networking topologies. (e.g. Bus, Ring, Star, Extended-Star, Mesh, Tree)
 - f. Demonstrate how to troubleshoot and diagnose a network problem using a systematic approach identifying the appropriate tools, selecting an appropriate course of action to resolve the problem, and document the solution. (e.g. Ping, traceret, IP config, wiring diagrams)
 - g. Identify and explain common methods to ensure network security including antivirus software, user authentication, and firewall setup.
 - h. Identify issues that affect physical and remote access device security.
 - i. Define and demonstrate/purpose of fault tolerance, disaster recovery, various back-up types, firewalls, proxy servers, V-LANs, extranets and intranets and various network server operating systems.
2. Routing Protocols and Concepts
 - a. Describe and apply the concepts associated with the OSI/TCP-IP Models.
 - b. Identify addressing format, schemes, and technologies; and required settings for connectivity including classful/classless address ranges, public/private addressing, and subnetting.
 - c. Describe the purpose and function/functionality of a router and the path taken by packets throughout a network.
 - d. Demonstrate how to configure/troubleshoot and explain different routing protocols. (e.g. static, default routing, distance-vector)
3. Small to Medium Business or ISP Networking
 - a. Demonstrate how communication occurs between hosts.
 - b. Describe the different WAN connectivity to telecommunication services. (e.g. ISDN, POP, T1)
 - c. Demonstrate the ability to monitor network performance, isolate and repair failures and troubleshoot problems utilizing an organized layered procedure.
4. LAN Switching and Wireless
 - a. Explain the technology and media access control method for Ethernet networks.
 - b. Describe the standards associated with wireless A, B, G, N standards, IEEE alliance.
 - c. Demonstrate wireless security protocols and be able to describe wireless services

Connections

Post-Secondary: KCTCS CIT-160 Introduction to Networking

CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)

Kentucky Occupational Skill Standards

Secretary's Commission on Achieving Necessary Skills (SCANS)

Common Core State Standards ELA and Math

Network Fundamentals: Introduction to Networks (Cisco I)
Valid Course Code
110902

Course Description: Introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. Provides the opportunity to build simple LAN topologies by applying principles of cabling; performing basic configurations of network devices, including routers and switches; and implementing IP addressing schemes. Completes one of a series of four courses that helps prepare students for the Cisco Certified Network Associate (CCNA) certification exam and the Cisco Certified Entry Networking Technician (CCENT). (This is the first course in the Cisco Curriculum.)

Content/Process

Students will:

- 1) Explain how communication works and the importance of data networks and the Internet in supporting business communications and everyday activities:
 - a. Importance of Networks.
 - b. Network impacts on daily lives
 - c. Role of data networking in the human network
 - d. Key network component identification
 - e. Opportunities and challenges of converged networks
 - f. Characteristics of network architectures
 - g. Installing network application
- 2) Recognize the devices and services that are used to support communications across an Internet network:
 - a. Network Components
 - b. Network devices
 - c. Network connections
 - d. Network communication
 - e. Network rules and processes
 - f. Network tools and commands
- 3) Describe the importance of addressing and naming schemes at various layers of data networks.
- 4) Examine network protocol models to explain the layers of communications in data networks.
- 5) Identify protocols and services provided by the layers in the OSI and TCP/IP models:
 - a. OSI and TCP/IP Models Overview
 - b. Functions
 - c. Services
 - d. Communication across layers
 - e. Peer-to-peer
 - f. Compatibility
 - g. Network analysis tools

- h. Transport Layer:
 - i. Role and functions
 - ii. Layer Protocols: TCP and UDP
 - iii. Layer Protocol use and key functions
 - i. Network Layer:
 - i. Role and functions
 - ii. Layer Protocol: IP
 - 1. Layer Protocol use and key functions
 - 2. Communication devices
 - 3. Dynamic and Static routes, next-hop addresses, and packet forwarding
 - j. IP Addressing
 - i. IP Version 4 addressing structure, classes, reserved networks
 - ii. IP Version 6 addressing structure and format
 - iii. Binary, decimal, and hexadecimal number systems and number conversions between the three
 - iv. Address assignment using IP version 4 and IP version 6
 - v. Classfull IP Ranges
 - vi. Classless IP Ranges
 - vii. Host and network addressing
 - viii. Common testing utilities
 - ix. Explain the fundamental concepts of routing
- 6) Design, calculate, and apply subnet masks and addresses to fulfill given requirements.
- 7) Employ basic cabling and network designs to connect devices in accordance with stated objectives:
- a. Ethernet
 - i. Evolution and history
 - ii. Ethernet fields
 - iii. Functions, characteristics, and media access
 - iv. Ethernet and its relationship to the OSI and TCP/IP models
 - v. Ethernet hubs and switches
 - vi. Address Resolution Protocol (ARP)
- 8) Design a simple Ethernet network using routers, switches, hubs, and a variety of hosts.
- 9) Explain the role of physical layer protocols and services in supporting communications across data networks:
- a. Physical Layer
 - i. Role and Functions
 - ii. Layer signaling and coding
 - iii. Layer Protocol use and key functions
 - iv. Media characteristics and uses (OH 8, 9)
 - v. Correct use of different types of network media
- 10) Describe the operation of protocols at the OSI data link layer and explain how they support communications:
- a. Data Link Layer
 - i. Role and Functions
 - ii. MAC address structure

- iii. Unicasts, multicasts, and broadcasts
- iv. Layer Protocol use and key functions
- v. Communication devices
- vi. common logical network topologies
- vii. Encapsulation process
- viii. Frame components

11) Use command-line interface commands to perform basic router and switch configuration and verification. Analyze the operations and features of common application layer protocols such as Hypertext Transfer Protocol (HTTP), Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), Simple Mail Transfer Protocol (SMTP), File Transfer Protocol (FTP), and Telnet.

12) Utilize common network utilities to verify small network operations and analyze data traffic.

13) Describe initial switch configuration tasks including remote access and management and switching technologies.

Connections

- Post-Secondary: KCTCS CIT-161 Networking Fundamentals
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills
- Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Routing Protocols and Concepts – Routing and Switching Essentials – Cisco II
Valid Course Code
110903

Course Description:

Provides students with the skills necessary to understand and apply concepts related to networking routing and switching hardware. Covers TCP/IP concepts such as IP addressing and subnetting, router configuration, routed and routing protocols. Completes one of a series of four courses that helps prepare students for the Cisco Certified Network Associate (CCNA) certification exam and the Cisco Certified Entry Networking Technician (CCENT). (This is the second course in the Cisco Curriculum.)

Content/Process

Students Will:

1. Describe the purpose and use of routers and routing tables.
2. Explain the critical role routers play in enabling communications across multiple networks
3. Describe how a router determines a path and switches packets in routed networks.
4. Explain the route lookup process and the path packets will take in a network.
5. Demonstrate ability to perform basic configurations for a newly-installed router.
6. Describe the purpose of static routes and dynamic routing protocols in the context of modern network design.
7. Configure and verify static and default routing.
8. Describe how metrics are used by routing protocols and identify the metric types used by dynamic routing protocols.
9. Identify and describe the characteristics of distance vector and link-state routing protocols.
10. Describe the network discovery process of distance vector routing protocols using Routing Information Protocol (RIP).
11. Describe the functions, characteristics, and operations of the RIPv1, RIPv2, EIGRP, and OSPF protocols.
12. Compare and contrast classful and classless IP addressing and behaviors in routed networks.
13. Design and implement a classless IP addressing scheme for a given network.
14. Apply configuration commands with routers implementing EIGRP and OSPF.
15. Configure and verify basic RIPv1, RIPv2, single area OSPF, and EIGRP operations in a small routed network.
16. Apply router commands to troubleshoot common errors that occur in local area networks.
17. Explain basic switching concepts and the operation of Cisco switches.
18. Describe how VLANs create logically separate networks and how routing occurs between them.
19. Configure, verify and troubleshoot VLANs, trunking, interVLAN routing, VTP, and RSTP
20. Verify network status and switch operation using basic utilities such as ping, trace-route, Telnet, Address Resolution Protocol (ARP), and ipconfig.
21. Identify, prescribe, and resolve common switched network media issues, configuration issues, autonegotiation, and switch hardware failures.
22. Manage IOS software and configuration files.
23. Configure and troubleshoot NAT and DHCP.

Connections

- Post-Secondary: KCTCS CIT 167 Routing Protocols and Concepts
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Cisco CCNA Certification/CCENT Certification
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

LAN Switching and Wireless/Scaling Networks – Cisco III
Valid Course Code
110904

Course Description:

This course provides students with the skills necessary to understand and apply advanced networking concepts. Covers local area network (LAN) switching, virtual local area networks (VLANs), advanced network design concepts, advanced router configuration and advanced network management projects. Completes one of a series of four courses that helps prepare students for the Cisco Certified Network Associate (CCNA) certification exam and the Cisco Certified Entry Networking Technician (CCENT). (This is the third course in the Cisco Curriculum.)

Content/Process

Students Will:

1. Identify and correct common network problems at layers 1,2,3, and 7 using a layered model approach.
2. Interpret network diagrams.
3. Select the appropriate media, cables, ports, and connectors to connect switches to other network devices and hosts.
4. Explain the technology and media access control method for Ethernet networks.
5. Describe standards associated with wireless media, such as IEEE WI-FI Alliance and ITU/FCC.
6. Identify basic configuration and implementation parameters on a wireless network to ensure that devices connect to the correct access points with minimal interference.
7. Compare and contrast Wi-Fi Protected Access (WPA) security features and capabilities of open, Wired Equivalent Privacy (WEP), and WPA-1/2 networks.
8. Perform, verify, and troubleshoot switch configuration tasks from a console and by remote access including initial configuration, VLANs, VLAN Trunking Protocol (VTP), Spanning Tree Protocols (STP, RSTP, PVSTP), and interVLAN routing.
9. Apply configuration commands implementing OSPF and EIGRP.
10. Manage Cisco IOS® Software, licensing, and configuration files.
11. Identify and describe the purpose and configuration of the components in a small wireless network, such as Service Set Identification (SSID), Basic Service Set (BSS), and Extended Service Set (ESS).

Connections

- Post-Secondary: KCTCS CIT 209 LAN Switching and Wireless
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Cisco CCNA Certification/CCENT Certification
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Accessing the WAN/Connecting Networks – Cisco IV
Valid Course Code
110905

Accessing the WAN/Connecting Networks – Cisco IV
Valid Course Code
110905

Course Description:

Provides students with the skills necessary to understand and apply advanced principles and applications in deploying networking hardware. Covers WAN design, WAN connectivity protocols such as PPP, xDLS, and Frame Relay, as well as advanced network management projects. Completes one of a series of four courses that helps prepare students for the Cisco Certified Network Associate (CCNA) certification exam and the Cisco Certified Entry Networking Technician (CCENT). (This is the fourth course in the Cisco Curriculum.)

Content/Process

Students Will:

1. Identify and correct common network problems at OSI layers 1, 2, 3, and 7 using a layered model approach.
2. Interpret network diagrams including selection of appropriate infrastructure materials.
3. Explain the technology and media access control method for Ethernet networks.
4. Use the command line interface and Windows© utilities to troubleshoot common errors that occur in switched networks.
5. Manage Cisco IOS® Software and configuration files.
6. Configure and troubleshoot WAN technologies including Frame Relay and PPP.
7. Use of monitoring tools such as Syslog, SNMP, and Netflow.
8. Implementing and troubleshoot VPNs.

Connections

- Post-Secondary: KCTCS CIT 212 Accessing the WAN
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Cisco CCNA Certification/CCENT Certification
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Districts that offer the following SREB Advanced Career Course must have a SREB signed agreement and instructors must have taken the two week per course training prior to teaching the course

(SREB courses require an agreement between SREB Advanced Career and the Local School District; please see the link to [SREB](#) for further information)

**Computers, Networks, Databases
SREB Advanced Career Curriculum
Course 1 - Informatics
Valid Course Code
111001**

Course Description: This project-based-learning course engages students who are curious about informatics. In this course, students will learn how to use a design process to create systems that acquire, store and communicate data for a variety of career fields. Students will work collaboratively in teams to design systems, solve problems, think critically, be creative and communicate with each other and business partners. Students will participate in real-world experiences such as designing an inventory system for a retail store, comparing stores in a company to project future sales, track customer buying habits and more. Last, students will engage in leadership skill sets encompassing their student organization responsibilities.

Content/Process

Students will:

- 1) Use the technical design process to design, build and test prototypes
- 2) Use terminology of the field
- 3) Use data and informatics tools to make decisions and solve problems
- 4) Apply project management principles
- 5) Use appropriate and effective research skills
- 6) Demonstrate proficiency in word processing, spreadsheets/databases, and presentation software
- 7) Communicate information, including descriptive statistics, to various stakeholder groups

Connections

- Post-Secondary: KCTCS INF 120
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Cisco CCNA Certification/CCENT Certification
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Districts that offer the following SREB Advanced Career Course must have a SREB signed agreement and instructors must have taken the two week per course training prior to teaching the course

(SREB courses require an agreement between SREB Advanced Career and the Local School District; please see the link to [SREB](#) for further information)

**Design for the Digital World
SREB Advanced Career Curriculum
Course 2 - Informatics
Valid Course Code
111002**

Course Description:

This project-based-learning course engages students who are interested in applying the design process to create systems such as a cloud-based digital storage system for images. Students will design a system to automatically collect and report data on highway usage. They will apply a geospatial system to map a store and develop a database that studies shopping habits. Through these projects, students will learn about data management and logic-based queries by collecting data, using the Global Positioning System (GPS) and analyzing data utilizing a geographic information system (GIS). They will learn how to automate data collection to make processes more effective and efficient. Students will work collaboratively in teams and demonstrate their knowledge and skills by presenting new and innovative ideas, techniques and solutions to business and industry partners.

Content/Process

Student will:

1. Use terminology of the field.
2. Research informatics technical texts, journal articles, and other related documents in developing a plan.
1. Use the five-step software/system life cycle (i.e., design, build, test, implement, and evolve).
2. Use informatics concepts to solve problems.
3. Use data and informatics tools to make decisions and solve problems.
4. Apply project management principles.
5. Gain information on how the American computer industry works.
6. Use appropriate and effective research skills.
7. Use best practices to design and implement research studies.
8. Use the scientific method to design investigations.
9. Demonstrate proficiency in word processing, spreadsheets/databases, and presentation software.
10. Communicate information, including descriptive statistics, to various audiences

Connections

- Post-Secondary: KCTCS INF 120
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Cisco CCNA Certification/CCENT Certification
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Districts that offer the following SREB Advanced Career Course must have a SREB signed agreement and instructors must have taken the two week per course training prior to teaching the course

(SREB courses require an agreement between SREB Advanced Career and the Local School District; please see the link to [SREB](#) for further information)

Databases in the Cloud
SREB Advanced Career Curriculum
Course 3 - Informatics
Valid Course Code
111003

Course Description:

This project-based-learning course is for students who successfully completed courses one and two and who want to tackle the more complex challenges that business and industry face. Students at this level will learn about Web technologies, cloud storage, information security, data, animation, introductory computer programming and database applications. Students will take more responsibility for their own learning, problem solving and thinking outside of the box. Real-world challenges will require higher levels of research, building, testing, analyzing and improving systems. Students will develop solutions for real-world problems by designing a database for ticket sales; designing security for a database; creating a game with animation; reporting information based on population data in a community; and designing, building and testing an application for a database.

Content/Process

Students Will:

1. Use terminology of the field.
2. Research informatics technical texts, journal articles, and other related documents in developing a plan.
3. Use the five-step software/system life cycle (i.e., design, build, test, implement, and evolve).
4. Use informatics concepts to solve problems.
5. Use data and informatics tools to make decisions and solve problems.
6. Apply project management principles.
7. Gain information on how the American computer industry works.
8. Use appropriate and effective research skills.
9. Use best practices to design and implement research studies.
10. Use the scientific method to design investigations.
11. Demonstrate proficiency in word processing, spreadsheets/databases, and presentation software.
12. Communicate information, including descriptive statistics, to various audiences

Connections

- Post-Secondary:
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Cisco CCNA Certification/CCENT Certification
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Districts that offer the following SREB Advanced Career Course must have a SREB signed agreement and instructors must have taken the two week per course training prior to teaching the course

(SREB courses require an agreement between SREB Advanced Career and the Local School District; please see the link to [SREB](#) for further information)

**Developing a Cloud Presence
SREB Advanced Career Curriculum
Course 4 - Informatics
Valid Course Code
111004**

Course Description

Students in this capstone course will focus on the ethics of privacy, social networking, designing for clients and artificial intelligence through six authentic projects. Students will select a business partner and design, build and test a Web presence for a company that will apply the concepts from the three prior courses. Student teams will work collaboratively with a business partner to develop a proposal for the project with evaluation criteria. Once the business partner accepts the proposal, the student team will implement it by designing, planning, building the system, and testing and revising the system to meet the needs of the business. Depending on articulation agreements or state policy, opportunity for dual credit may be available to students who successfully complete this course.

Content/Process:

Students Will:

1. Use terminology of the field.
2. Research informatics technical texts, journal articles, and other related documents in developing a plan.
3. Use the five-step software/system life cycle (i.e., design, build, test, implement, and evolve).
4. Use informatics concepts to solve problems.
5. Use data and informatics tools to make decisions and solve problems.
6. Apply project management principles.
7. Gain information on how the American computer industry works.
8. Use appropriate and effective research skills.
9. Use best practices to design and implement research studies.
10. Use the scientific method to design investigations.
11. Demonstrate proficiency in word processing, spreadsheets/databases, and presentation software.
12. Communicate information, including descriptive statistics, to various audiences

Connections

- Post-Secondary:
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Cisco CCNA Certification/CCENT Certification
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Help Desk Operations
Valid Course Code
110102

Course Description: Introduces a variety of tools and techniques to provide user support in help desk operations. Explores help desk concepts, customer service skills, troubleshooting problems, writing for end users, help desk operations and software, needs analysis, facilities management, and other topics related to end user support.

Content/Process

Students will:

1. Define the role of help desk and customer service in an organization.
 - a. Introduction to Help Desk Service Tools, Technology, and Techniques.
 - b. How organizations provide user support
 - c. Types of support tools - software and hardware
 - d. Troubleshooting techniques
 - e. Common support problems
2. Evaluate help desk technology, tools and techniques.
 - a. Developing Soft Skills for Achieving End-User Satisfaction
 - b. Delivering quality computer user support
 - c. Active listening and communications with customers
 - d. Creating a positive telephone image and skills
 - e. Technical writing skills for support professionals
 - f. Managing and disseminating information
 - g. Handling difficult customer situations
3. Identify common support problems, including software tools and features.
 - a. User support Needs Analysis, Evaluation, and Assessment.
 - b. Basic strategies to perform user needs analysis and assessment
 - c. Major steps analysis undertake to analyze and assess a user's needs
 - d. Common tools that aid support specialists in a user needs analysis project
 - e. How product and support standards emerged
 - f. Common tools and methods support specialists use to evaluate and select computer products
4. Identify service technology trends.
 - a. Help Desk and computer Facilities Operation
 - b. Typical help desk organization and the incident management process
 - c. Hardware and software incident management tools
 - d. changes and trends in help desk environments
 - e. Major types of computer facilities and common facilities management problems.
 - f. User support management
5. Demonstrate professional and effective communication skills.
6. Demonstrate team building strategies.
7. Develop technical training materials, and other user documentation to support help desk operations.
 - a. Training Support Users
 - b. Goals of training activities
 - c. Steps in the training process
 - d. How to plan, prepare, and present a training session

- e. Writing for End Users a. Types of documentation
- f. Document planning c. Technical writing strategies
- 8. Demonstrate a methodical approach to the problem-solving process.
- 9. Apply conflict resolution techniques and skills in customer support.
- 10. Exhibit positive professionalism with customers and technical writing skills.
- 11. Demonstrate personal, system, and stress management by way of using self-help tools.
- 12. Use support performance and reporting tools, call management software, problem resolution software, asset and change management tools, and notification tools for support in additional level two and level three support tools.

Connections

- Post-Secondary KCTCS CIT-232 Help Desk Operations
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Management of Support Services
(Previously Help Desk II-revised standards)
Valid Course Code
110302

Course Description:

Digitally organizing the information technology and information and support services milestones achieved by the student that is reflective of their industry certification readiness, understanding the cost of doing business and preparation of technical and behavioral job performances i.e. interviews. The course also focuses on employability skills to include: a professional digital portfolio that emphasizes critical milestones focusing on entry level information technology technical and employability skills. This course could be taken with the help desk course enhancing skills in both courses.

Content/Process

Student Will:

Project Management

- Determine purpose and goals using a project management method
- Define, Design, Develop, Deploy, Reflect, Redesign, and present utilizing presentation software visualizing the process

Time Management

- Determine roles, tasks, calendars
- Utilize Software packages for project management i.e. MS Project, Excel, Visio, Dream-Spark, Prezi

Integration of Data Security

- Utilize and define appropriate terminology
- Present information in a technical report
- Publish information presenting to an advisory board member

Identify potential employment barriers for non-traditional groups and ways to overcome the barrier

- Research potential barriers placing information in a spreadsheet
- Present information to school principal and peers
- Synthesize the information collecting producing a product that could help overcome the barrier with non-traditional groups

Connections

- Post-Secondary
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

**Microsoft Active Directory
Server/Server Infrastructure
Admin/Security Certification
Valid Course Code
110907**

Course Description:

Provides students with the knowledge and skills necessary to install, configure, and administer Microsoft Windows Directory Services. Focuses on implementing Group Policy and understanding the Group Policy tasks required to centrally manage users and computers. Assists in prepping students for exams in the Microsoft certification exam series.

Content/Process

Students Will:

1. Describe the logical and physical components of Directory Services. Introduction to Windows Active Directory
 - a. What is Active Directory?
 - b. Active Directory objects
 - c. Active Directory schema
 - d. Lightweight Directory Access Protocol (LDAP)
 - e. Active Directory logical structure
 - f. Active Directory physical structure
 - g. Administering a Windows network
2. Configure the DNS Server service to support Directory Services. Configuring the Domain Name System (DNS) Server Service to Support Active Directory
 - a. DNS namespace
 - b. Service resource (SRV) records
 - c. How clients use DNS to locate domain controllers.
3. Create a Windows domain by installing Directory Services on a computer running a Windows Server operating system. Creating a Windows Domain
 - a. Introduction to creating a Windows domain
 - b. Installing Active Directory
 - c. Performing post Active Directory installation tasks.
 - d. Examining the default structure of Active Directory
 - e. Implementing an organizational unit structure
 - f. Removing Active Directory.
4. Set up and administer domain user accounts and groups. Creating and Administering User Accounts and Group Resources
 - a. Introduction to logon names
 - b. Creating multiple domain user accounts
 - c. Using groups in Active Directory
 - d. Strategies for using groups in a domain.
5. Publish resources - including shared folders, printers and services - in Directory Services.
 - a. Introduction to publishing resources
 - b. Setting up and administering published printers

- c. Creating printer location
 - d. Setting up and administering published shared folders
 - e. Locating resources.
- 6. Delegate administrative control of Directory Services objects to decentralize administration in a Windows network.
 - a. Object security in Active Directory
 - b. Controlling access to Active Directory objects
 - c. Delegating administrative control
 - d. Custom MMC consoles.
- 7. Implement Group Policy to centrally manage users and computers
 - a. Introduction to Group Policy
 - b. Group Policy structure
 - c. Working with Group Policy objects
 - d. Modifying Group Policy inheritance
 - e. Delegating administrative control of a Group Policy object.
- 8. Use Group Policy to configure and manage the user desktop environment. Managing User Environments by Using Group Policy
 - a. Introduction to managing user environments
 - b. Using administrative templates in Group Policy
 - c. Assigning scripts in Group Policy
 - d. Using Group Policy to redirect user folders
 - e. Using Group Policy to secure the user environment.
- 9. Use Group Policy to deploy and manage software.
 - a. Introduction to managing software deployment
 - b. Windows Installer technology
 - c. Deploying software
 - d. Configuring software deployment
 - e. Maintaining deployed software
 - f. Removing deployed software
 - g. Troubleshooting software deployment.
- 10. Use Group Policy to implement and manage security settings.
- 11. Create and manage Directory Services trees and forests.
 - a. Introduction to trees and forests
 - b. Creating trees and forests
 - c. Trust relationships in trees and forests
 - d. The global catalog
 - e. Strategies for using groups in trees and forests.
- 12. Manage Directory Services replication within a site and between sites.
 - a. Replication components and processes
 - b. Replication topology
 - c. Using sites to optimize Active Directory replication
 - d. Implementing sites to manage Active Directory replication
 - e. Monitoring replication traffic
 - f. Adjusting replication.
- 13. Manage operations masters
 - a. Introduction to managing operations masters
 - b. Operations master roles
 - c. Managing operations masters
 - d. Managing operation master failures.

14. Manage and restore the Directory Services database.
 - a. Introduction to maintaining the Active Directory database
 - b. Modifying data in Active Directory
 - c. Moving the Active Directory database
 - d. Defragmenting the Active Directory database
 - e. Backing up the Active Directory database
 - f. Restoring Active Directory.
15. Implement and administer Directory Services based on a directory services design provided by an enterprise architect.

Connections

- Post-Secondary:
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Network Hardware Installation and Troubleshooting
Valid Course Code
110906

Course Description:

This course is designed to provide students with the knowledge and skills necessary to design, install, configure, and troubleshoot cabling systems and equipment used to connect a local area network.

Content/Process

Students Will:

1. Design a basic network layout using copper and/or fiber optic cabling systems
2. Terminate, test, and trouble shoot copper wire systems
3. Install and configure network interface cards and connection equipment
4. Use industrial standard testing and certification equipment.

I. Introduction

- A. Overview of Network Wiring
- B. Overview of Network Hardware

II. Copper Wire Plants

- A. UTP
- B. Category 3
- C. Category 4
- D. Category 5
- E. CDDI
- F. Termination Techniques
- G. Plant Design and Layout
- H. Testing and Certification

III. Fiber Optics Plants

- A. Different Cable Types
- B. Termination Techniques
- C. Design and Layout
- D. Testing and Certification

IV. Structured Wire Systems

- A. Designing a Wire Plant for a Room
- B. Designing a Wire Plant for a Building
- C. Mixing Wire Types

V. LAN Hardware

- A. Overview of Ethernet and Token Ring
- B. Types of NIC's
- C. Types of Hubs

VI. NIC's

- A. Installing
- B. Configuring
- C. Testing
- D. Troubleshooting

VII. Connection Equipment

- A. Hubs
- B. Switches
- C. Configurations
- D. Testing
- E. Troubleshooting

Connections

- Post-Secondary: CIT 260
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Microsoft Client/Server Config
Valid Course Code
110913

Course Description:

Covers installation and configuration of Microsoft Windows client and server operating systems.
Helps prepare students for exams in the Microsoft certification exam series.

Content/Process

Students Will:

1. Install and upgrade client and server operating system.
2. Automate a Windows operating system installation.
3. Configure and manage hardware through the Windows operating system.
4. Configure and manage disks and partitions.
5. Configure and manage file systems.
6. Configure and troubleshoot the boot process.
7. Configure the desktop environment.
8. Configure and support Transmission Control Protocol/Internet Protocol (TCP/IP).
9. Provide access to network resources and support remote users.
10. Configure and manage mobile computing.
11. Monitor and optimize operating system performance and resource usage.
12. Implement disaster protection.
13. Create and manage user accounts and groups.
14. Implement operating system security.
15. Configure printing and print services.
- I. Installing or Upgrading Windows Operating Systems
 - A. Preparing for installation
 - B. Installing Windows client
 - C. Installing Windows server
 - D. Upgrading Windows client or server
 - E. Resolving setup failures
- II. Configuring the Windows Environment
 - A. Managing hardware
 - B. Configuring display settings
 - C. Changing startup and recovery options
 - D. Multilingual support and accessibility options
 - E. Environmental variables
 - F. Power management
- III. Connecting Windows to Networks and Internet
 - A. Overview of Windows connectivity
 - B. Connecting to a Microsoft network
 - C. Connecting to the internet
 - D. Resolving connectivity issues
- IV. Creating and Managing User Accounts
 - A. Introduction to user accounts
 - B. Requirements for new user accounts
 - C. Creating a user account
 - D. Customizing user settings with user profiles

- E. Managing user home folders
- V. Managing Access to Resources by Using Groups
 - A. Introduction to groups
 - B. Developing a group strategy
 - C. Using built-in groups
 - D. Implementing groups
- VI. Configuring and Managing Disks and Partitions
 - A. Windows disk storage types
 - B. Creating volumes on a dynamic drive
 - C. Performing common disk management tasks
 - D. Resolving disk and partition configuration issues
- VII. Managing Data by Using Nt File System (Ntfs)
 - A. What are NTFS permissions?
 - B. How Windows 2000 applies NTFS permissions
 - C. Assigning NTFS permissions
 - D. Compressing data on NTFS partitions
 - E. Configuring disk quotas on NTFS volumes
- VIII. Providing Network Access to File Resources
 - A. What are shared folders?
 - B. Creating shared folders
 - C. Combining NTFS permissions and shared folders
 - D. Configuring shared folders by using distributed file system (DFS)
- IX. Configuring Printing
 - A. Introduction to Windows printing
 - B. Adding a printer
 - C. Configuring a network printer
 - D. Configuring web-based printer support
- X. Implementing Windows Security
 - A. Introduction to Windows security
 - B. Windows security policies
 - C. Implementing security policies
 - D. Auditing access to system resources
 - E. Securing data by using encrypting file system (EFS)
- XI. Maintaining the Windows Environment
 - A. Managing applications
 - B. Deploying service packs and hot fixes
 - C. Managing hardware
- XII. Monitoring and Optimizing Performance in Windows
 - A. Monitoring system resources
 - B. Monitoring event logs
 - C. Optimizing performance
 - D. Resolving issues
- XIII. Implementing Disaster Protection
 - A. Configuring ups
 - B. Providing data redundancy with fault tolerance
 - C. Using backup utility
 - D. Recovering from a computer disaster
 - E. Resolving disaster protection issues
- XIV. Configuring Windows for Mobile Computing

- A. Configure hardware for mobile computing
- B. Configure power management options
- C. Making files available offline
- D. Connecting to network remotely

Connections

- Post-Secondary: KCTCS CIT 213 MS Client/Server Config
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Security Fundamentals
Valid Course Code
110912

Course Description:

Introduces basic computer and network security concepts and methodologies. Covers principles of: security; compliance and operational security; threats and vulnerabilities; network security; application, data, and host security; access control and identity management; and cryptography.

Content/Process

Students Will:

1. Explain basic security concepts.
 2. Identify and explain appropriate use of security tools to facilitate security.
 3. Evaluate current security issues related to computer and network systems.
 4. Evaluate and select appropriate incident response procedures, disaster recovery, and risk identification techniques to ensure business continuity.
 5. Differentiate various malware and systems security threats against computers and networks.
 6. Explain the vulnerabilities and mitigations associated with computers and network devices.
 7. Explain the proper use of common tools for carrying out vulnerability assessments.
 8. Identify and describe potential application and data vulnerabilities, including buffer overflow, DLL injection, and SQL injection.
 9. Explain how host firewalls, malware protection, and updates are important to application and data security.
 10. Describe the importance of user accounts and associated permissions.
 11. Compare and discuss logical and physical access control security methods.
 12. Explain authentication models and identify components of each model.
 13. Summarize and explain general cryptography concepts.
 14. Demonstrate public and private key pairs for digital signing and encryption/decryption.
- I. Principles of Security
- A. Physical security
 - B. Environmental security
 - C. Information security
 - D. Personnel security
 - E. Network security
- II. Compliance and Operational Security
- A. Risks and mitigation strategies
 - B. Disaster recovery and incident response procedures
 - C. Security awareness
 - D. Business continuity and environmental controls
 - E. Confidentiality, integrity, and availability (CIA)
- III. Threats and Vulnerabilities
- A. Malware awareness

- B. Computer, social engineering, and application attacks
- C. Deterrent techniques
- D. Security threats discovery techniques
- E. Penetration testing versus vulnerability scanning
- IV. Network Security
 - A. Security functions
 - B. Administration principles
 - C. Network design elements
 - D. Common protocols and ports
 - E. Wireless networks
- V. Application, Data and Host Security
 - A. Application and data security importance
 - B. Host security procedures
- VI. Access Control and Identity Management
 - A. Authentication services and functions
 - B. Best practices
 - C. Access control models
- VII. Cryptography
 - A. General cryptography concepts
 - B. Cryptographic tools
 - C. Public key infrastructure
 - D. Key and certificate management

Connections

- Post-Secondary: KCTCS CIT 180 Security Fundamentals
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Productivity Software
Valid Course Code
110204

Course Description:

Utilizes current word processing, spreadsheet, database, and presentation application software to solve common technology and business problems. Covers basic features of each software application.

Content/Process

Students Will:

1. Use a productivity software package to create, edit, print, and save documents.
 2. Use productivity tools such as spelling and grammar.
 3. Apply formatting features such as font, color, margins, headers, and footers.
 4. Use tools such as cut, copy and paste within a document and between documents.
 5. Create HTML file formats for web publishing.
 6. Create new documents using templates and wizards.
 7. Use a word processing program to insert and use table features.
 8. Use a word processing program to insert and use table column features.
 9. Insert pictures and Clipart into word processing documents.
 10. Use a spreadsheet package to create common business reports and budgets.
 11. Use mathematical formulas and common statistical, date, financial, and logical functions.
 12. Make formatting changes to a worksheet including column width, row height, cell, and table formatting.
 13. Use autofill to copy and paste formulas and repeat patterns.
 14. Create effective charts, including bar, line, and pie charts, to accompany business reports.
 15. Use a relational database management program to create tables, queries, forms, reports, and labels.
 16. Use query feature to extract information from a database using simple and compound conditions.
 17. Use relationship feature to join tables in a database and obtain information from multiple tables.
 18. Plan and create an electronic slide show presentation using a presentation software package.
 19. Use timing, transition, and animation features to enhance a presentation.
- I. Productivity Software
- A. Create
 - B. Edit
 - C. Print
 - D. Save
 - E. Spelling
 - F. Grammar
 - G. Formatting features
 1. Font
 2. Color

- 3. Margins
- 4. Headers and footers
- 5. Design styles and themes
- 6. Page orientation
- I. Cut
- J. Copy
- K. Paste
- L. Save as HTML format
- M. Create, edit, and use templates
- N. Wizards
- II. Word Processing
 - A. Tables
 - B. Columns
 - C. Pictures and Clipart
- III. Spreadsheet
 - A. Common business reports and budgets
 - B. Mathematical formulas
 - C. Statistical, date, financial and logical functions
 - D. Formatting
 - 1. Column width
 - 2. Row height
 - 3. Cell and table formatting.
 - E. Autofill
 - F. Charts
 - 1. Bar
 - 2. Line
 - 3. Pie
- IV. Database management
 - A. Tables
 - B. Forms
 - C. Reports
 - D. Labels
 - E. Query
 - 1. Simple
 - 2. Compound conditions.
 - F. Relationship feature to join tables
- V. Presentation
 - A. Slide layout
 - B. Timing
 - C. Transition
 - D. Animation

Connections

- Post-Secondary: KCTCS CIT 130 Productivity Software
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

C++ I
Valid Course Code
110202

Course Description:

Introduces students to fundamental programming concepts using the C++ programming language. Topics include data types, control structures, simple data structures, error-handling, modular programming, and information and file processing.

Content/Process

Students Will:

1. Demonstrate knowledge of the program development life cycle.
 2. Design, develop, compile, debug, test, run, and document programs in the C++ language using a software development kit.
 3. Design and develop programs using operators and assignments.
 4. Design and develop programs using primitive data types.
 5. Design and develop programs using sequence, selection, and repetition structures.
 6. Design and develop programs using single and multi-dimensional arrays.
 7. Design and develop programs using pointers.
 8. Design and develop programs using void and value passing function.
 9. Design and develop programs using object oriented programming features, including defining classes and instantiating objects.
 10. Design and develop programs using effective error and exception handling.
 11. Evaluate and critique effectiveness and efficiency of code.
- I. Program Development Life Cycle
- A. Steps in the life cycle
 - B. Using the life cycle
- II. Software Development Tools
- A. Write C++ code
 - B. Compile C++ code
 - C. Debug C++ code
- III. C++ Programming Fundamentals
- A. Keywords
 - B. Primitive data types
 - C. Variables
 - D. Constants
- IV. Operators and Assignments
- A. Assignment operators
 - B. Comparison operators
 - C. Arithmetic operators
 - D. Relational operators
 - H. Data type casting
- V. Control Structures

- A. Sequence
- B. Selection
- C. Repetition
- VI. Functions
 - A. Void
 - B. Value passing
- VII. Arrays and Pointers
 - A. Pointers
 - B. Single-dimension arrays
 - C. Multi-dimension arrays
- VIII. Errors
 - A. Types of errors
 - B. Exception handling
- IX. Structured Programming
 - A. User-defined functions
 - B. Modular programming
- X. Object-Oriented Anatomy
 - A. Classes
 - B. Objects
 - C. Instantiation
 - D. Arrays of objects
- XI. Evaluation of Programming
 - A. Effectiveness of code
 - B. Efficiency of code

Connections

- Post-Secondary: KCTCS CIT 142 C++ I
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Internet Technologies
Valid Course Code
110917

Course Description:

Provides students with a study of traditional and emerging Internet technologies. Covers topics including Internet fundamentals, Internet applications, Internet delivery systems, and Internet client/server computing. Provides a hands-on experience and some programming in an Internet environment.

Content/Process

Students Will:

1. Describe the history of the Internet and its impact on government, society, and business.
2. Describe the models used to organize Internet technologies.
3. Explain how the Internet is governed and the standards that are used.
4. Describe the protocols that make the Internet work.
5. Use Internet technologies for data transfer, remote access, information delivery, email, content presentation, and real-time collaboration.
6. Describe how the Internet is used for e-commerce.
7. Describe Internet naming conventions, URLs, and web server file organization.
8. Describe core connectivity issues such as NAT, ISPs, and IP addresses.
9. Create and publish simple web content using basic HTML(Hypertext Markup Language).
10. Use existing scripting applications and create simple client/server applications to enhance information delivery.

I. History of the Internet

- a. DARPA
- b. ARPANET
- c. TCP/IP
- d. RFCs (Requests For Comments)
- e. WWW (World Wide Web)

II. Internet Organization and Governing Bodies

- a. World Wide Web Consortium (W3C)
- b. NIC, InterNIC, IANA, and ICANN
- c. Truth in Domain Names Act
- d. PROTECT Act of 2003

III. Internet Technologies

- a. FTP
- b. Remote Access
- c. Email
- d. Blogs
- e. Twitter
- f. Wikis
- g. Multimedia
- h. Streaming video
- i. Video conferencing
- j. News groups
- k. Data feeds
- l. Listservs

- m. Podcasts
 - n. Encryption
- IV. E-commerce
 - a. Describe e-commerce and how it can be used
 - b. Describe how search engines are used to market web sites
 - c. Explain how search results can be influenced
 - d. Online shopping and security (SSL and certificates)
- V. Creating and Registering a Web Site
 - a. Obtaining a domain name
 - b. Common web servers and services
 - c. Web server organization
- VI. Creating and Publishing Web Content
 - a. HTML usage
 - b. HTML tags
 - c. Creating a web page
 - d. Web site organization
 - e. Publishing a web page
- VII. VII. Client-side and Server-side Programming
 - a. Client-side programming using JavaScript or other client-side programming language
 - b.** Server-side programming using ASP, PHP, Perl, or other server-side programming language

Connections

- Post-Secondary: KCTCS CIT 150 Internet Technologies
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

JavaScript
Valid Course Code
110809

Course Description:

Provides students with an overview of the JavaScript scripting language. Includes coding, testing, and debugging JavaScript programs; using variables, operators, and data types; creating dynamic web pages using JavaScript; controlling the behavior of forms, buttons, and text elements; and using control structures, pattern matching, objects, and application scripts.

Content/Process

Students will:

1. Demonstrate basic JavaScript variable types
2. Demonstrate JavaScript assignments statements
3. Demonstrate the input and output processes in JavaScript
4. Demonstrate arithmetic, string and logical operations
5. Demonstrate JavaScript control structures
6. Demonstrate JavaScript loop constructs
7. Demonstrate pattern matching using JavaScript
8. Demonstrate the relationship between JavaScript and Java
9. Demonstrate JavaScript objects
10. Demonstrate the ability to write JavaScript applications scripts

Connections

- Post-Secondary: KCTCS CIT 140 JavaScript
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Java I
Valid Course Code
110205

Course Description:

Introduces students to fundamental programming concepts using the Java programming language. Topics include data types, control structures, simple data structures, error-handling, object-oriented programming, graphical user interfaces, and modular programming.

Content/Process

Students Will:

1. Design, develop, compile, debug, test, run, and document programs in the Java language using a software development kit.
2. Design and develop programs using operators and assignments.
3. Design and develop programs using primitive data types.
4. Design and develop programs using sequence, selection, and repetition structures.
5. Design and develop programs using single and multi-dimensional arrays.
6. Design and develop programs using effective error and exception handling.
7. Design and develop programs using object oriented programming features, including defining classes, instantiating objects, and using arrays of objects.
8. Design and develop programs implementing user-defined methods and modular programming.
9. Design and develop programs using method overloading.
10. Design and develop programs using inheritance, encapsulation, and polymorphism.
11. Design and develop GUI interfaces for Java applications.
12. Evaluate and critique effectiveness and efficiency of code.

I. Software Development Tools

- A. Write Java code
- B. Compile Java code
- C. Debug Java code

II. Java Programming Fundamentals

- A. Keywords
- B. Primitive data types
- C. Variables
- D. Constants

III. Operators and Assignments

- A. Assignment operators
- B. Arithmetic operators
- C. Relational operators
- D. Logical operators
- E. Compound operators
- F. Data type casting

IV. Programming Structures

- A. Sequence
- B. Selection
- C. Repetition

V. Arrays

- A. Single-dimension arrays
- B. Multi-dimension arrays
- VI. Errors
 - A. Types of errors
 - B. Exception handling
- VII. Object-Oriented Anatomy
 - A. Classes
 - B. Objects
 - C. Instantiation
 - D. Arrays of objects
- VIII. Structured Programming
 - A. User-defined functions
 - B. Modular programming
- IX. Advanced Features
 - A. Overloading operators
 - B. Overloading methods
 - C. Polymorphism
 - D. Inheritance
 - E. Encapsulation
- X. Graphical User Interfaces
 - A. Frames and panels
 - B. GUI components
 - C. GUI design
 - D. GUI listeners
- XI. Evaluation of Programming
 - A. Effectiveness of code
 - B. Efficiency of code

Connections

- Post-Secondary: KCTCS CIT 149 Java-I
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Java II
Valid Course Code
110206

Course Description:

Provides students with an extensive overview of designing and developing advanced object-oriented applications using the Java programming language. Topics include input and output streams (file processing), polymorphism, inheritance, multithreading, recursion, mobile computing, and other advanced topics.

Content/Process

Students Will:

1. Design and develop programs that use advanced GUI components.
2. Design and develop programs that use input and output streams including character and binary streams.
3. Design and develop programs that use multithreading.
4. Design and develop programs that use polymorphism.
5. Design and develop programs that use inheritance.
6. Design and develop programs that use recursion.
7. Design and develop programs that introduce mobile application concepts.
8. Design and develop programs that incorporate other advanced features of Java programming.
9. Evaluate and critique effectiveness and efficiency of code.
 - I. Advanced GUI Components
 - A. Layout and layout managers
 - B. Swing components
 - II. Input and Output
 - A. Stream concepts
 - B. Character streams
 - C. Binary streams
 - III. Threads
 - A. Definition
 - B. Purpose
 - C. Implementation
 - D. Multithreading versus multiprocessing
 - IV. Polymorphism
 - A. Definition
 - B. Purpose
 - C. Implementation
 - V. Inheritance
 - A. Definition
 - B. Purpose
 - C. Implementation
 - VI. Recursion
 - A. Recursive algorithms
 - B. Recursion versus iteration
 - VII. Mobile Applications
 - A. Mobile computing concepts

- B. Creation of mobile applications
- VIII. Advanced Java
 - A. Advanced Java functions and features
 - B. Incorporating other Java functions and features
- IX. Evaluation of Programming
 - A. Effectiveness of code
 - B. Efficiency of code

Connections

- Post-Secondary: KCTCS CIT 249 Java-II
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Visual Basic I
Valid Course Code
110207

Course Description:

Introduces students to fundamental programming concepts using the Visual Basic programming language. Topics include data types, control structures, simple data structures, error-handling, modular programming, event-driven programming, graphical user interfaces, and file processing.

Content/Process

Students Will:

1. Demonstrate knowledge of the program development life cycle.
 2. Design, develop, compile, debug, test, run, and document event-drive programs in the Visual Basic programming language.
 3. Design and develop programs using operators and assignments.
 4. Design and develop programs using primitive data types.
 5. Design and develop programs using sequence, selection, and repetition structures.
 6. Design and develop programs using single and multi-dimensional arrays.
 7. Demonstrate knowledge of file processing in Visual Basic.
 8. Demonstrate knowledge of object oriented programming features in Visual Basic.
 9. Design and develop programs using effective error and exception handling.
 10. Evaluate and critique effectiveness and efficiency of code.
-
- I. Program Development Life Cycle
 - A. Steps in the life cycle
 - B. Using the life cycle
 - II. Software Development Tools
 - A. Write event-driven Visual Basic code
 - B. Compile Visual Basic code
 - C. Debug Visual Basic code
 - III. Programming Fundamentals
 - A. Keywords
 - B. Primitive data types
 - C. Variables
 - D. Constants
 - IV. Operators and Assignments
 - A. Assignment operators
 - B. Comparison operators
 - C. Arithmetic operators
 - D. Relational operators
 - E. Conversion between data types
 - V. Control Structures
 - A. Sequence
 - B. Selection
 - C. Repetition
 - VI. Arrays

- A. Single-dimension arrays
 - B. Multi-dimension arrays
- VII. File Processing
 - A. File formats
 - B. Reading from and writing to files
- VIII. Errors
 - A. Types of errors
 - B. Exception handling
- IX. Structured Programming
 - A. User-defined functions
 - B. Modular programming
- X. Object-Oriented Anatomy
 - A. Classes
 - B. Objects
 - C. Instantiation
- XI. Evaluation of Programming
 - A. Effectiveness of code
 - B. Efficiency of code

Connections

- Post-Secondary: KCTCS CIT 148 Visual Basic I
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Visual Basic II: Creating Desktop Applications
Valid Course Code
110208

Course Description:

Provides students with an extensive overview of designing advanced computer applications using the Visual Basic programming language. Topics include graphical user interfaces, event-driven programming, modular programming, object-oriented programming, advanced data types and structures, input validation, error-handling, and file and database processing.

Content/Process

Students Will:

1. Design and develop an event-driven application, including a well-designed user interface.
2. Demonstrate understanding of modular design.
3. Demonstrate understanding of object-oriented programming.
3. Design and code applications using advanced data types and structures.
4. Implement input validation and processing.
5. Demonstrate error-checking and error handling.
6. Implement file and database processing.
7. Evaluate and critique effectiveness and efficiency of code.

I. Application design

- A. Using the Microsoft Solutions Framework (MSF)
- B. Designing a system architecture
- C. VB.NET fundamentals
- D. The Visual Studio.NET integrated development environment
- E. Event-driven design
- F. Graphical user interfaces

II. Advanced Design

- A. User interface design principles
- B. Managing forms
- C. Using controls
- D. Using menus

III. Modular Programming

- A. Designing modules
- B. Creating modules
- C. Reusable modules and code

IV. Object-Oriented Programming

- A. Classes
- B. Objects
- C. Instantiation
- D. Inheritance
- E. Class libraries

V. Advanced Data Types and Structures

- A. Enumerated and structure data types
- B. Collections

VI. Validating and Processing User Input

- A. Overview of validation
- B. Implementing form-level validation
- C. Implementing field-level validation

VII. Error Handling

- A. Creating an error handler

- B. In-line error handling
- C. Centralized error handling
- VIII. File and Database Processing
 - A. File formats
 - B. Database access
 - C. SQL with Visual Basic
 - D. Creating data sets
 - E. Web forms
- IX. Evaluation of Programming
 - A. Effectiveness of code
 - B. Efficiency of code

Connections

- Post-Secondary: KCTCS CIT 248 Visual Basic II
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Introduction to GIS – ArcView
Valid Course Code
110107

Course Description:

This is an introductory course designed to provide basic theories and concepts of geographical information systems including basic GIS capabilities, data collection, data types, GPS, and basic mapping concepts. Introduces GIS software using industry-specific applications and technology to provide a conceptual base to build expertise in GIS.

Content/Process

Students will:

1. Explain what GIS is and the practical applications used in this field.
 - I. Introduction to GIS Concepts
 - a. Definition of GIS and related information
 - b. Evolution of GIS
 - c. Projection and coordinate systems
 - d. Data models overview
 - e. Data management and display
- 2 Use GIS software to edit basic spatial and attribute data.
- 3 Use GIS software to create and use basic geo-databases.
 - II. Database Concepts and Terminology
 - a. Components of a database reviewed
 - b. Relationships and management
- 4 Explain basic topics of GIS such as spatial data and attribute data management.
 - III. Spatial Interpolation and Remote Sensing
 - a. Principles of remote sensing
 - b. System classifications
 - c. Surface and slope analysis
 - d. Gravity models
- 5 Explain the human and organizational issues.
- 6 Explain the differences between vector and raster data.
 - IV. Data Models and Digital Representations
 - a. Vector data models
 - b. Raster data models
 - c. Relationship between representation and analysis
- 7 Use GIS software to create basic query features.
 - V. Data Display and Exploration
 - a. Cartography
 - b. Classes of data
 - c. Image overlay
 - d. Geo-referencing
- 8 Use GIS software to build basic graphs and reports and personal systems.
 - VI. Quality and Standards
 - a. Data quality
 - b. Assessment
 - c. Managing data errors
 - d. GIS development

Connections

- Post-Secondary: KCTCS CIT 125
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

GIS Software Tools and Applications
Valid Course Code
110315

Course Description:

This course develops skills using Geographical Information System (GIS) software extensions for network analysis, spatial analysis, and 3D analysis in GIS.

Content/Process

Students will:

1. Solve route problems from sets of interconnected lines using a network analysis program.
 - I. Network Analysis
 - a. Finding the best route
 - b. Defining travel costs
 - c. Finding the closest facility
 - d. Modeling traffic flow
 - e. Modeling intersections
- 2 Combine layers of GIS data and to locate areas of special concern using a spatial analysis program.
 - II. Spatial Analysis
 - a. Investigating grids
 - b. Creating surfaces
 - c. Analyzing density and distance
 - d. Converting grids and setting their properties
 - e. Using a map calculator
 - f. Creating statistics and generalizing data
- 3 Create 3 dimensional representations of landscapes and other surfaces using satellite and aerial photographic images using a 3D analysis program.
 - III. 3D Analysis
 - a. displaying data in 3D
 - b. Symbolizing TIN (triangulated irregular networks) themes.
 - c. Creating 3D feature data
 - d. Creating TIN data
 - e. Analyzing paths
 - f. Analyzing visibility
 - g. Aligning data
 - h. Data file structures

Connections

- Post-Secondary: KCTCS CIT 225
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Introduction to Database Design (Fundamentals)
Valid Course Code
110211

Course Description:

Provides an overview of database and database management system concepts, internal design models, normalization, network data models, development tools, and applications.

Content/Process

Students Will:

1. Define a database and its uses.
- 2 Describe the difference between traditional files and databases.
 - I. Database Concepts
 - a. Traditional files versus databases
 - b. Database systems
 - c. Data models
- 3 Define a database management system (DBMS) and describe the services a DBMS provides to users.
- 4 Identify and describe the main features of hierarchical network, and relational database models.
 - II. Modeling and Design Concepts
 - a. Relational database model
 - b. Entity relationship (ER) model
 - c. Advanced data models
 - d. Normalization of database tables
- 5 Demonstrate an understanding of the difference between logical and physical design.
- 6 Model a realistic business application using a technology-independent data model.
- 7 Design and implement a database using the relational model, with emphasis on data integrity and security.
 - III. Design and Implementation
 - a. Introduction to Structured Query Language (SQL)
 - b. Advanced SQL
 - c. Database design
- 8 Define and use the normalization process to further refine the relational table definitions.
- 9 Demonstrate an understanding of the database administration function.
 - IV. Database Optimization
 - a. Transaction management and concurrency control
 - b. Database performance tuning and query optimization
 - c. Database administration and security
- 10 Task 9 continued
 - V. Implementation Strategies
 - a. Distributed database management systems
 - b. Business intelligence and data warehouses
 - c. Database connectivity and web technologies

- 11 Define and be able to use data definition language, data manipulation language, and instructions that apply relational algebra.
- 12 Demonstrate an understanding of distributed database systems.
- 13 Evaluate and select an appropriate DBMS for a given application.

Connections

- Post-Secondary: KCTCS CIT 170
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Information Technology Co-op
Valid Course Code
110918

Course Description:

Cooperative Education for CTE courses provide supervised work site experience related to the student's identified career pathway. A student must be enrolled in an approved capstone course during the same school year that the co-op experience is completed. Students who participate receive a salary for these experiences, in accordance with local, state and federal minimum wage requirements according to the Work Based Learning Guide.

Content/Process

Students will:

1. Demonstrate and practice safe work habits at all times.
2. Gain career awareness and the opportunity to test career choice(s)
3. Receive work experience related to career interests
4. Integrate classroom studies with work experience
5. Receive exposure to facilities and equipment unavailable in a classroom setting
6. Increase employability potential

Connections

- Post-Secondary: KCTCS CIT 199
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Information Technology Internship
Valid Course Code
110919

Course Description:

Internship for CTE courses provide supervised work-site experience for high school students who are enrolled in a capstone course associated with their identified career pathway. Internship experiences consist of a combination of classroom instruction and field experiences. A student receiving pay for an intern experience is one who is participating in an experience that lasts a semester or longer and has an established employee-employer relationship. A non-paid internship affects those students who participate on a short-term basis (semester or less). All information referenced to the Work Based Learning Guide.

Content/Process

Students will:

1. Demonstrate and practice safe work habits at all times.
2. Gain career awareness and the opportunity to test career choice(s)
3. Receive work experience related to career interests
4. Integrate classroom studies with work experience
5. Receive exposure to facilities and equipment unavailable in a classroom setting
6. Increase employability potential

Connections

- Post-Secondary: KCTCS CIT 290
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Leadership Dynamics
Valid Course Code
110399

Course Description:

This course is designed to assist students with developing skills needed to be successful leaders and responsible members of society. This student will develop personal attributes and social skills. Emphasis will be placed on interpersonal skills, team building, communication, personal development and leadership. This course will include opportunities for students to apply their knowledge.

Content/Process

Students will:

1. Investigate types of leadership and determine personal style.
2. Compare and contrast positive and negative characteristics of leaders.
3. Identify the role of leadership in the global society.
4. Assess the role that qualified leaders have on the success of organizations.
5. Explain how cultural and social diversity and equity impact leadership skills.
6. Identify and explain the importance of team membership skills for individuals and groups.
7. Develop interpersonal skills for resolving conflicts that occur in the home, school, community and workplace.
8. Demonstrate verbal and nonverbal communication skills needed for personal and leadership roles.
9. Make informed decisions using decision-making process.
10. Demonstrate appropriate parliamentary procedure skills used in meetings.
11. Analyze leadership opportunities available in school and community.
12. Describe how ethical and social behaviors affect individuals.
13. Develop personal goals.
14. Demonstrate appropriate business, professional and social etiquette.
15. Analyze the role self-management has on use of time and stress.

Connections

- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Game Design Principles
Valid Course Code
113605

Course Description:

This course is an introduction to Game Design and Gaming. The course provides an overview of story development, gaming history, game reviews, current gaming trends and industry software. Students will begin to create and develop a game story/plot that can be further developed in higher level courses as well as critique current games. In addition, 2D game development software and image manipulation will be explored to further enhance their design skills. Career exploration into game design will be researched and gain awareness of job and post-secondary opportunities.

Content/Process

Students Will:

1. Game Design & History:
 - a. Identify Game Design Career Skills
 - b. Identify Game Genres
 - c. Create a game design overview & plan
 - d. Create a backstory
2. Writing a Review:
 - a. Evaluate writing techniques for writing a review
 - b. Produce a game critique writing piece
3. Photo Manipulation Basics:
 - a. Identify common photo manipulation software tools (selection, paintbrush...)
 - b. Produce a project utilizing layers
 - c. Produce a project utilizing tracing & drawing (pencil tool, brushes, paint fill...)
 - d. Apply color & hue changing skills
 - e. Apply zoom and crop skills
 - f. Apply filters to images
 - g. Apply text insertion skills
 - h. Model correctly saving images for specific purpose
4. 2D Game Production Software:
 - a. Create one-player, two-player game 2D games
 - b. Demonstrate importing and creating sprites
 - c. Apply object insertion in a game utilizing library assets
 - d. Produce a game that utilizes controls (keyboard, game controller)
 - e. Use object animation in a game
 - f. Create events in a game utilizing logic similar to programming code
 - g. Model 2D game layout techniques
5. Introduction to Programming:
 - a. Explain statement, Boolean expressions, conditions, loops, variables, threads and events

- b. Produce projects that utilize statements, Boolean expressions, conditions, loops, variables, threads and events using basic programming software (Scratch, Alice...)

6. Programming:

- a. Compare various programming languages
- b. Insert comments
- c. Utilizes an industry programming language (C++, Python...) to produce simple games
- d. Apply the use of statements, Boolean expressions, conditions, loops, and variables to produce simple games

Connections

- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Digital 3D Game Graphics
Valid Course Code
113601

Course Description:

This course will focus on creating games using code, animation, and an introduction to 3D design software utilized in the industry. In addition, students will see how the skills and knowledge acquired in Game Design I & II come together utilizing a game engine. Emphasizes creating 3D graphics using one or more state-of-the-art software packages. Provides students with a thorough understanding of techniques for designing advanced 3D games and simulations. Courses will cover 2D and 3D graphics, animation, character development, texturing, rigging, scripting and game setup using state-of-the-art software development tools.

Content/Process

Students Will:

1. Game Development (w/ images & scripting)
 - a. Explain frames, layers & timelines
 - b. Apply frames, layers & timelines to a given project
 - c. Explain how code (JavaScript) applies to the action results in a game
 - d. Utilize code variables (enemies in games, timers, lives...)
 - e. Apply code to artificial intelligence in a game
 - f. Utilize Else If statements (properly functioning character movement)
 - g. Utilize Loop functions (regenerating enemies, health packs...)
 - h. Publish .exe & .html files
2. Game Animation Introduction
 - a. Convert symbols to objects
 - b. Use an animation timeline
 - c. Create symbols w/ tracing & duplicating
 - d. Apply simple animation
 - e. Apply sounds to animations
 - f. Apply bones to animations

- g. Produce a walking object
 - h. Create foreground & background to produce 3d appearance
 - i. Publish products so it can be shared
3. 3D Modeling Basics

- a. Explain 3D modeling industry
- b. Demonstrate 3d modeling software interfaces
- c. Create 3D models utilizing basic shapes
- d. Apply Coloring & Texturing to a 3D model
- e. Produce a 3d model from a 2D image/model
- f. Apply the skill of adding bones to a model
- g. Create a 3D terrain (dirt, grass, clouds...)
- h. Produce a rendered product

4. 3D Modeling Animation Basics

- a. Explain a stage in reference to animation programs
- b. Explain key frames in reference to animation programs
- c. Apply lighting to a stage (brightness, shadowing...)
- d. Utilize loops in animation
- e. Create a walk cycle
- f. Produce animation effects (explosion, liquid...)

5. Game Engine Basics

- a. Demonstrate game engine interface skills
- b. Use assets in a game engine
- c. Create a scene
- d. Apply script & game object attachment
- e. Use camera angles & lighting in a scene

6. Photo Manipulation

- a. Use the brush tools to produce projects (opacity, size, brush flow...)
- b. Utilizing selection tools

- c. Produce a project using layer skills (duplicate, merge, group...)
 - d. Apply blending modes to an image
 - e. Apply transform tools to a project (scale, rotate, skew, distort...)
 - f. Apply a mask to images
 - g. Apply image adjustments to an image (brightness/contrast, levels, hue/saturation...)
 - h. Apply layer styles to images (shadows, glow, overlays...)
 - i. Apply filters to images (render, blur...)
7. 3D Modeling:
- a. Utilize various menus and tools in a 3D software package.
 - b. Create 3D Objects.
 - c. Create Lines and Curves in 3D software.
 - d. Create Three Dimensional Polygons and Advanced Objects.
 - e. Create and apply Materials and Textures for realistic objects and surfaces.
 - f. Demonstrate skills in applying cameras and adjusting lighting in 3D objects and surfaces.
 - g. Demonstrate animating simple 3D Objects.
 - h. Demonstrate applying key frames & motion paths

- I. Interface
 - A. Menus
 - B. Panels
 - C. Toolbars
 - D. Command line
 - E. Animation controls
 - F. Hiding toolbars
 - G. Displaying hidden toolbars
 - H. Help menu
- II. Objects
 - A. Creating
 - B. Selecting
 - C. Moving
 - D. Rotating
 - E. Scaling
 - F. Modifying
 - G. Pivot points
 - H. Aligning
 - I. Positioning

- III. Lines and curves
 - A. Creating
 - B. Editing
 - C. Vertices
 - D. Creating shapes
- IV. Polygons
 - A. Creating
 - B. Editing
 - C. Altering
 - D. Subdividing
- V. Materials and textures
 - A. Understanding
 - B. Applying
 - C. Editing
 - D. Painting
 - E. Shadowing
- VI. Cameras and lights
 - A. Working with cameras
 - B. Positioning cameras
 - C. Working with lights
 - D. Adjusting light settings
 - E. Creating light effects
- VII. Introduction to animation
 - A. Key frames
 - B. Motion paths
 - C. Animation curves
 - D. Controlling

Connections

- Post Secondary:
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Game & Engine Development, Animation
Valid Course Code
113602

Course Description:

This course will focus on creating games using code, 3d characters, objects, and animation utilizing game engines. Students will see how the skills and knowledge acquired in Game Design I - III come together. Students will create work ready products for the industry.

Content/Process

Students Will:

I. Advanced Game Engine

- a. Demonstrate game engine interface skills
- b. Use asset workflows (importing, combining, adding to scene...)
- c. Create scenes (objects, cameras, lights, applying script)
- d. Create prefabs
- e. Produce a published build
- f. Utilize game input techniques
- g. Create terrain using a game engine
- h. Create sprites using a game engine
- i. Explain rendering features
- j. Explain mesh as it pertains to game engines
- k. Explain collision detection
- l. Utilize scripts in a game engine
- m. Apply audio in a scene
- n. Apply character navigation

11. Work Products

- a. Produce various work ready products for industry
- b. Develop a college or career plan (contact numbers, degree research...)
- c. Research additional skills and software used in the industry to study independently (i.e. App development)

- I. Work Area
 - A. Becoming familiar with the interface
 - B. Tools
 - C. Palettes
 - D. Menus

- II. 3D World
 - A. Understanding the 3D environment
 - B. Concepts and terms

- III. 3D Files
 - A. 3D file formats
 - B. Importing objects
 - C. Meshes

- IV. 3D Painting and textures
 - A. 2D versus 3D textures
 - B. Creating textures
 - C. Painting textures on objects

- V. 3D Objects
 - A. Shapes
 - B. 2D meshes versus 3D meshes

- VI. Lights
 - A. Types of lights
 - B. Choosing the right light
 - C. Creating and applying lighting

- VII. 3D Camera
 - A. Views
 - B. Manipulating
 - C. Customizing

- VIII. Rendering
 - A. Render settings
 - B. Render options

Connections

- Post-Secondary:
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Digital 3D Graphics & Special Effects II
Valid Course Code
113604

Course Description:

This course will focus on creating games using code, 3d characters, objects, and animation utilizing game engines. Students will see how the skills and knowledge acquired in Game Design come together. Students will create work ready products for the industry. Introduces advanced texturing and lighting techniques to enhance depth perception and realism within 3D environments.

Content/Process

Students will:

1. Demonstrate an understanding of how to add textures to objects.
2. Use appropriate types of lighting techniques to designs.
3. Demonstrate adding depth using different types of shadowing techniques.
4. Create custom connections and color utilities to innovative designs.
5. Use indirect and direct illumination to designs.
6. Implement ray tracing using mental ray to individual and team designs.

- I. Textures
 - A. Shaders
 - B. Types of materials
 - C. Maps
 - D. Texture mapping
 - E. Planar mapping
 - F. Procedural mapping
 - G. Layering
- II. Lighting
 - A. Types
 - B. Linking and unlinking
 - C. Light Fog
 - D. Light Glow
- III. Shadows
 - A. Depth maps
 - B. Raytracing
 - C. Linking and unlinking shadows

Connections

- Post Secondary:
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Advanced 3D Game Development
Valid Course Code
113603

Course Description:

Emphasizes creating 3D graphics using one or more state-of-the-art software packages. Provides students with a thorough understanding of techniques for designing advanced 3D games and simulations. Courses will cover 2D and 3D graphics, animation, character development, texturing, rigging, scripting and game setup using state-of-the-art software development tools.

Content/Process

Students will:

1. Advanced Photo Manipulation:

- a. Use the brush tools to produce projects (opacity, size, brush flow...)
- b. Utilizing selection tools
- c. Produce a project using layer skills (duplicate, merge, group...)
- d. Apply blending modes to an image
- e. Apply transform tools to a project (scale, rotate, skew, distort...)
- f. Apply a mask to images
- g. Apply image adjustments to an image (brightness/contrast, levels, hue/saturation...)
- h. Apply layer styles to images (shadows, glow, overlays...)
- i. Apply filters to images (render, blur...)

2. Advanced 3d Modeling:

- a. Utilize various menus and tools in a 3 Dimensional software package.
- b. Create Three Dimensional Objects.
- c. Create Lines and Curves in 3Dimensional software.
- d. Create Three Dimensional Polygons and Advanced Objects.
- e. Create and apply Materials and Textures for realistic objects and surfaces.
- f. Demonstrate skills in applying cameras and adjusting lighting in 3 Dimensional objects and surfaces.
- g. Demonstrate animating simple 3 Dimensional Objects.
- h. Demonstrate applying key frames & motion paths

Connections

- Post Secondary:
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

FLASH with Action Script
Valid Course Code
110810

Course Description:

This course will help students gain knowledge about Flash and apply the fundamental principles for creating video, web sites, and interactive gaming projects. Flash CS4 can be used in this course.

Content/Process

Students Will:

1. Work with Flash Tools and Menus
2. Demonstrate an understanding of Graphics using FLASH
3. Understand and work on Editing Objects
4. Demonstrate usage of Working with Layers
5. Work on Editing and Formatting Text
6. Use the Creating Symbols: Graphic, Movie Clip, and Button in FLASH
7. Use the Creating Buttons in FLASH
8. Demonstrate an understanding of using Animations – Designing and Editing
9. Understand ActionScript in FLASH
10. Use Audio – Acquiring and Editing in FLASH
11. Demonstrate an understanding for Putting Components Together in FLASH
12. Demonstrate how to Publish Flash Files
13. Demonstrate Game Design using Flash ActionScript

Connections

- Post Secondary:
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Special Topics In Computer Science

Valid Course Code

110752

Special Topics in GIS

Valid Course Code

110316

Special Topics in Information Support and Services

Valid Course Code

110152

Special Topics in Networking

Valid Course Code

110952

Special Topics in Programming

Valid Course Code

110252

Special Topics in Web Development & Administration

Valid Course Code

110852

All these courses can be utilized, with justification for course and course objectives, upon approval by Information Technology Consultant Related to Career Major.

Connections

- Post Secondary: KCTCS CIT 299 (GIS only - CIT 229)
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Computer Graphics
Valid Course Code
110213

Course Description:

Introduces basic computer graphics with special emphasis on graphics for games.

Content/Process

Students Will:

1. Identify the principles of communication through visual medium using text, still imagery and video technology
- 2 Explain copyright laws affecting digital graphics including images and image use.
- 3 Identify the purpose of, audience, storyboarding and audience needs for preparing image(s)
- 4 Explain the design process for various forms of digital media
- 5 Identify considerations of designing for a specific audience, including paid customers
- 6 Analyze and evaluate digital media content for audience, purpose and design techniques
- 7 Identify trends in the use and creation of digitally generated media
- 8 Explain the key elements of drawing and painting
- 9 Explain image resolution, image size, and image file format for web, video, and print
- 10 Demonstrate effective message composition and design using industry standard design elements and principles: Design Principles a) Balance b) Emphasis through dominance and influence in an image c) Harmony through complementary layers and/or effects d) Unity of image elements e) Opposition through contrasting visual aspects f) Rhythm
- 11 Task 10 continued Design Elements a) Perspective/3D/Depth/Space b) Color c) Font d) Proportion e) Layers f) Light and Shadow g) Line h) Shape i) Form/Volume j) Texture k) Layout l) Value/Tone m) Motion
- 12 Explain the principles of image composition a. Rule of Thirds b. Golden Section Rule c. Diagonal Rule
- 13 Explain digital typography.
- 14 Differentiate between typeface and font.
- 15 Demonstrate digital camera and scanner operation
- 16 Define digital image terminology
- 17 Explain image and editing layers.
- 18 Demonstrate importing, exporting, organizing, and saving digital graphic files.
- 19 Manipulate image selections and measurement.
- 20 Use digital graphic editing software guides and rulers.
- 21 Transform digital images using editing applications.
- 22 Adjust or correct the tonal range, color, or distortions of an image using editing applications.
- 23 Explain retouching and blending images
- 24 Explain and apply digital image editing filters.
- 25 Prepare images for web, print, and video
- 26 Identify career and entrepreneurial opportunities in digital graphics technology.

Connections

- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math